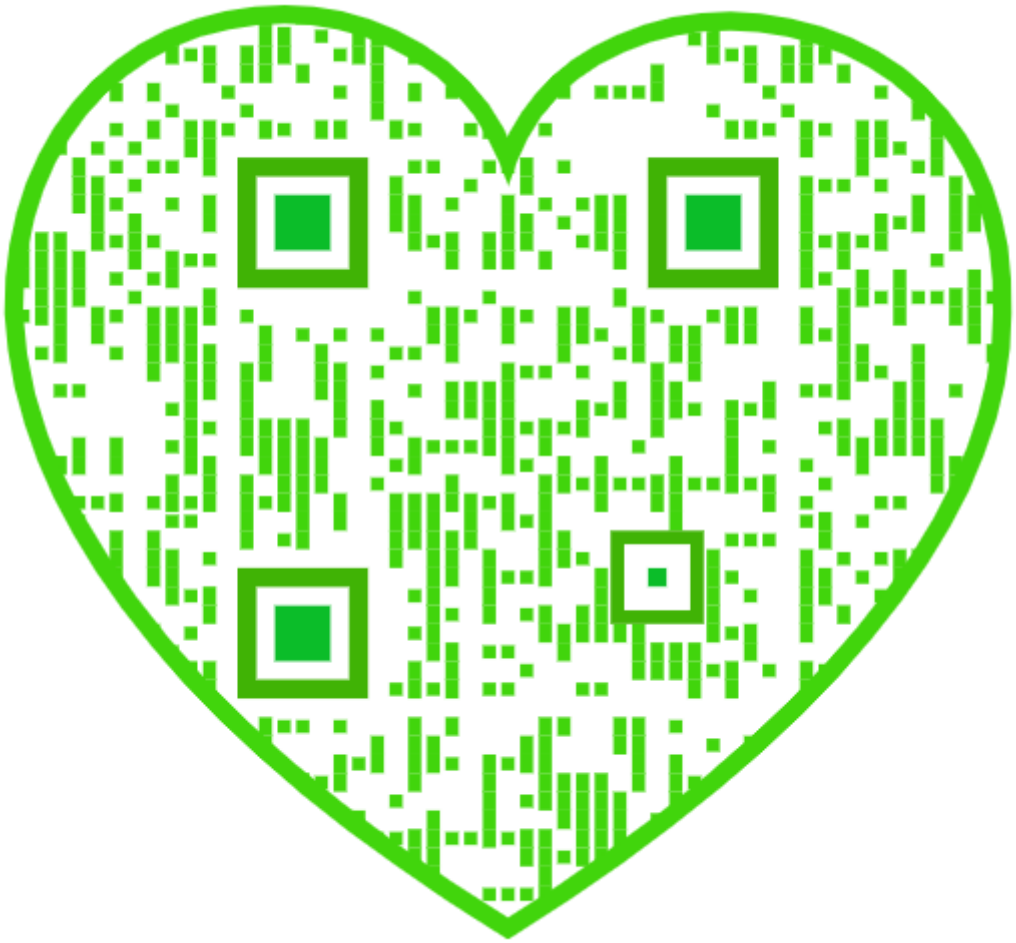

TRANSACTIONS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

VOL. XXVI

FOR THE YEAR 1913

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NOTE.

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

DR. E. GUSTAV ZINKE, *Secretary*,
4 W. SEVENTH AVENUE, CINCINNATI.

[Minutes and discussions stenographically reported by WILLIAM WHITFORD, Chicago, Ill.]

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CONSTITUTION AND BY-LAWS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

TOGETHER WITH

MINUTES OF THE TWENTY-SIXTH ANNUAL MEETING

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

CONSTITUTION.

I. The name of this Association shall be THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

II. Its object shall be the cultivation and promotion of knowledge in whatever relates to Abdominal Surgery, Obstetrics, and Gynecology.

MEMBERS.

III. The members of this Association shall consist of Ordinary Fellows, Honorary Fellows, Corresponding Fellows, and Senior Fellows.

The Ordinary Fellows shall not exceed one hundred and fifty in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Executive Council at least one month before the first day of meeting, by two Fellows, and shall be balloted for at the annual meeting, a list of names having been sent to every Fellow with the notification of the meeting.

A two-thirds vote in the affirmative of all the members present shall be necessary to elect—fifteen Fellows at least being in attendance.

All candidates for active fellowship shall submit to the Executive Council, at least one month before the annual meeting, an original paper relating to Abdominal Surgery, Obstetrics, or Gynecology.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Executive Council.

Their election shall take place in the same manner as that of Ordinary Fellows.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, but shall not be required to pay any fee.

CORRESPONDING FELLOWS.

V. The Corresponding Fellows shall be recommended by the Executive Council and elected by the Association.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, and shall be entitled to a copy of the annual TRANSACTIONS.

They shall pay an annual fee of five dollars.

SENIOR FELLOWS.

Senior Fellows shall be nominated by the Executive Council, and elected by the Association as provided for in the election of Honorary Fellows, and they shall enjoy the same privileges as are accorded Corresponding Fellows.

OFFICERS.

VI. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and six Executive Councillors.

The nomination of all officers shall be made in open session at the business meeting, and the election shall be by ballot.

The first five officers shall enter upon their duties immediately before the adjournment of the meeting at which they shall be elected, and shall hold office for one year.

"At the election next succeeding the adoption of these laws, the full number of Executive Councillors shall be elected; two for a term of three years, two for a term of two years, and two for a term of one year.

"At every subsequent election two Councillors shall be elected for a term of three years, and shall continue in office until their successors shall have been elected and shall have qualified."[1]

Any vacancy occurring during the recess may be filled temporarily by the Executive Council.

ANNUAL MEETINGS.

VII. The time and place of holding the annual meeting shall

[1] Amendment adopted September 21, 1898.

be determined by the Association or may be committed to the Executive Council each time before adjournment.

It shall continue for three days, unless otherwise ordered by vote of the Association.

AMENDMENTS.

VIII. This Constitution may be amended by a two-thirds vote of all the Fellows present at the annual meeting: *provided*, that notice of the proposed amendment shall have been given in writing at the annual meeting next preceding: and *provided, further*, that such notice shall have been printed in the notification of the meeting at which the vote is to be taken.

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

BY-LAWS.

THE PRESIDING OFFICER.

I. The President, or in his absence, one of the Vice-Presidents, shall preside at all meetings, and perform such other duties as ordinarily pertain to the Chair.

The presiding officer shall be *ex-officio* chairman of the Executive Council, but shall vote therein only in case of a tie.

SECRETARY.

II. The Secretary shall attend and keep a record of all meetings of the Association and of the Executive Council, of which latter he shall be *ex-officio* clerk, and shall be entitled to vote therein.

He shall collect all moneys due from the members, and shall pay the same over to the Treasurer, taking his receipt therefor.

He shall supervise and conduct all correspondence of the Association; he shall superintend the publication of the TRANSACTIONS under the direction of the Executive Council, and shall perform all the ordinary duties of his office.

He shall be the custodian of the seal, books, and records of the Association.

TREASURER.

III. The Treasurer shall receive all moneys from the Secretary, pay all bills, and render an account thereof at the annual meetings, when an Auditing Committee shall be appointed to examine his accounts and vouchers.

EXECUTIVE COUNCIL.

IV. The Executive Council shall meet as often as the interests of the Association may require. The President, or any three members may call a meeting, and a majority shall constitute a quorum.

It shall have the management of the affairs of the Association, subject to the action of the house at its annual meetings.

It shall have control of the publications of the Association, with full power to accept or reject papers or discussions.

It shall have control of the arrangements for the annual meetings, and shall determine the order of the reading of papers.

It shall constitute a court of inquiry for the investigation of all charges against members for offences involving law or honor; and it shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Association shall be as follows:

1. General meeting at 10 o'clock A. M.
   a. Reports of Committees on Scientific Questions.
   b. Reading of Papers and Discussion of the same.
2. One business Meeting shall be held at half-past nine o'clock A. M. on the first day of the session, and another on the evening of the second day (unless otherwise ordered by vote), at which only the Fellows of the Association shall be present. At these meetings the Secretary's record shall be read; the Treasurer's Accounts submitted; the reports of Committees on other than scientific subjects offered; and all Miscellaneous Business transacted.

PAPERS.

VI. The titles of all papers to be read at any annual meeting shall be furnished to the Secretary *not later* than one month before the first day of the meeting.

No paper shall be read before the Association that has already been published, or that has been read before any other body.

Not more than thirty minutes shall be occupied in reading any paper before the Association.

Abstracts of all papers read should be furnished to the Secretary at the meeting.

All papers read before the Association shall become its sole property if accepted for publication; and the Executive Council may decline to publish any paper not handed to the Secretary *complete* before the final adjournment of the annual meeting.

QUORUM.

VII. The Fellows present shall constitute a quorum for all business, excepting the admission of new Fellows or acting upon amendments to the Constitution, when not less than fifteen Fellows must be present.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at any meeting, except when introduced by the Executive Council.

FINANCE.

IX. Each Fellow, on admission, shall pay an initiation fee of twenty-five dollars, which shall include his dues for the first year.

Every Fellow shall pay, *in advance* (*i.e.*, at the beginning of each fiscal year) the sum of twenty dollars annually thereafter.

[A fiscal year includes the period of time between the first day of one annual meeting and the first day of the next.]

Any Fellow neglecting to pay his annual dues for two years may forfeit his membership, upon vote of the Executive Council.

The Secretary shall receive, annually, a draft from the President, drawn on the Treasurer, for a sum, to be fixed by the Executive Council, for the services he shall have rendered the Association during the year.

A contingent fund of one hundred dollars shall be placed annually at the disposal of the Secretary for current expenses, to be disbursed by him, and for which he shall present proper vouchers.

ATTENDANCE.

X. Any Fellow who shall neither attend nor present a paper for five consecutive years, unless he offer a satisfactory excuse, shall be dropped from fellowship, upon vote of the Executive Council.

RULES.

XI. *Robert's Rules of Order* shall be accepted as a parliamentary guide in the deliberations of the Association.

AMENDMENTS.

XII. These By-Laws may be amended by a two-thirds vote of the Fellows present at any meeting; *provided*, previous notice in writing shall have been given at the annual meeting next preceding the one at which the vote is to be taken.

OFFICERS FOR 1913–1914

PRESIDENT

CHARLES N. SMITH, Toledo

VICE-PRESIDENTS

HUGO OTTO PANTZER, Indianapolis
JOSEPH H. BRANHAM, Baltimore

SECRETARY

E. GUSTAV ZINKE, Cincinnati

TREASURER

HERMAN E. HAYD, Buffalo

EXECUTIVE COUNCIL

CHARLES L. BONIFIELD, Cincinnati
HERMAN E. HAYD, Buffalo
JOHN W. KEEFE, Providence
X. O. WERDER, Pittsburgh
LOUIS FRANK, Louisville
MILES F. PORTER, Fort Wayne

LIST OF OFFICERS.

From the Organization to the Present.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer.*
1888.	Taylor, Wm. H.	Montgomery, E. E. Carstens, J. H.	Potter, Wm. W.	Werder, X. O.
1889.	Montgomery, E. E.	Myers, W. H. Banta, R. L.	Potter, Wm. W.	Werder, X. O.
1890.	Wright, A. H.	Rohé, G. H. Hall, R. B.	Potter, Wm. W.	Werder, X. O.
1891.	Vander Veer, A.	Hill, H. E. Morris, R. T.	Potter, Wm. W.	Werder, X. O.
1892.	McMurtry, L. S.	Ill, Ed. J. Longyear, H. W.	Potter, Wm. W.	Werder, X. O.
1893.	Rohé, Geo. H.	Manton, W. P. Hulbert, Geo. F.	Potter, Wm. W.	Werder, X. O.
1894.	Carstens, J. H.	Davis, W. E. B. Howitt, H.	Potter, Wm. W.	Werder, X. O.
1895.	Price, Joseph	Cordier, Al. H. Peck, G. S.	Potter, Wm. W.	Werder, X. O.
1896.	Ross, J. F. W.	Johnston, G. B. Sexton, J. C.	Potter, Wm. W.	Werder, X. O.
1897.	Reed, C. A. L.	Douglas, R. Dorsett, W. B.	Potter, Wm. W.	Werder, X. O.
1898.	Ill, Edward J.	Ricketts, Ed. Miller, A. B.	Potter, Wm. W.	Werder, X. O.
1899.	Hall, R. B.	Dunning, L. H. Crofford, T. J.	Potter, Wm. W.	Werder, X. O.
1900.	Davis, W. E. B.	Walker, Ed. Goldspohn, A.	Potter, Wm. W.	Werder, X. O.
1901.	Ricketts, E.	Cumston, C. G. Porter, M. F.	Potter, Wm. W.	Werder, X. O.
1902.	Dunning, L. H.	Rosenwasser, M. Hayd, H. E.	Potter, Wm. W.	Werder, X. O.
1903.	Dorsett, W. B.	Miller, A. B. Haggard, W. D.	Potter, Wm. W.	Werder, X. O.
1904.	Longyear H. W.	Gilliam, D. T. Brown, J. Y.	Potter, Wm. W.	Werder, X. O.
1905.	Brown, J. Y.	West, J. N. Simpson, F. F.	Potter, Wm. W.	Werder, X. O.
1906.	Morris, R. T.	Crile, G. W. Bonifield, C. L.	Potter, Wm. W.	Werder, X. O.
1907.	Zinke, E. G.	Keefe, J. W. Sellman, W. A. B.	Potter, Wm. W.	Werder, X. O.
1908.	Humiston, Wm. H.	Sadlier, J. E. Davis, J. D. S.	Potter, Wm. W.	Werder, X. O.
1909.	Miller, A. B.	Smith, C. N. Huggins, R. R.	Potter, Wm. W.	Werder, X. O.
1910.	Hayd, H. E.	Schwarz, H. Morris, L. C.	Potter, Wm. W.	Werder, X. O.
1911.	Werder, X. O.	Frank, L. Tate, M. A.	Zinke, E. G.	Hayd, H. E.
1912.	Porter, M. F.	Smith, C. N. Sadlier, J. E.	Zinke, E. G.	Hayd, H. E.
1913.	Smith, C. N.	Pantzer, H. O. Branham, J. H.	Zinke, E. G.	Hayd, H. E.

HONORARY FELLOWS.

1899.—BALLANTYNE, JOHN WILLIAM, M.D., F.R.C.P.E., F.R.S. Edin. Lecturer on Midwifery and Gynecology, School of Medicine of the Royal Colleges, Surgeons' Hall, Edinburgh; Physician to the Royal Maternity Hospital, Edinburgh; formerly President of the Edinburgh Obstetrical Society; Examiner in Midwifery in the University of Edinburgh; Honorary Fellow of the Glasgow Obstetrical and Gynecological Society. 19 Rothesay Terrace, Edinburgh, Scotland.

1889.—BANTOCK, GEORGE GRANVILLE, M.D., F.R.C.S. Ed. Surgeon to the Samaritan Free Hospital. Broad Meadow, King's Norton, Birmingham, England.

1889.—BARBOUR, SIR A. H. FREELAND, M.A., B.S.C., M.D., F.R.C.P. Ed., F.R.S. Ed. Lecturer on Midwifery and Diseases of Women in the Edinburgh Medical School; Assistant Physician to the Royal Maternity Hospital; Assistant Physician for Diseases of Women to the Royal Infirmary; Physician to the Women's Dispensary; Fellow of the Edinburgh and London Obstetrical Societies, and of the British Gynecological Society; Corresponding Fellow of the Royal Academy of Medicine, Turin. 4 Charlotte Square, Edinburgh, Scotland.

1890.—CHAMPIONNIERE, JUST. LUCAS, M.D. 3 Avenue Montaigne, Paris, France.

1888.—CORDES, AUGUST ELISEE, M.D. Member of the Royal College of Physicians, London; Fellow of the Obstetrical Society of London and of the British Gynecological Society; Corresponding National Member of the Obstetrical and Gynecological Society of Paris; Honorary Fellow of the Detroit Gynecological Society; late "Chirurgien-adjoint" of the Obstetrical and Gynecological Clinic at the Maternity at Geneva; Consulting Accoucheur of the Miséricorde Hospital, etc.; Perpetual member of the Société Obstétricale de France, Paris, France. 3 Chemin du Square, Geneva, Switzerland.

1909.—CROFFORD, THOMAS JEFFERSON, M.D. Rex Arms Apartments, Orange St., Los Angeles, California.

1889.—CROOM, SIR J. HALLIDAY, M.D., F.R.C.P.E., F.R.C.S.E., F.R.S.E. Professor of Midwifery in the University of Edinburgh; Consulting Physician to the Royal Infirmary; Physician to the Royal Maternity Hospital; late President of the Royal College of Surgeons, Edinburgh. 25 Charlotte Square, Edinburgh, Scotland.

1891.—FERNANDEZ, JUAN SANTOS, M.D. Prado, No. 105, Havana, Cuba.

1889.—FREUND, WILLIAM ALEXANDER, M.D. Emeritus Professor and Director of the Clinic for Diseases of Women in the University of Strassburg. Kleiststrasse 9, Berlin W., Germany.

1912.—GILLIAM, DAVID TOD, M.D. Emeritus Professor of Gynecology, Starling-Ohio Medical College; Gynecologist to St. Anthony Hospital; Member of the American Medical Association, Ohio State Medical Association, Columbus Academy of Medicine; Honorary Member of the Northwestern Ohio Medical Association; Ex-president, Franklin County Medical Society; *Vice-president*, 1905. 333 East State Street, Columbus, Ohio.

1894.—JACOBS, CHARLES, M.D. Professor of the Faculty of Medicine of Brussels; Secretary-General of the Permanent Committee of the Periodic International Congress of Gynecology and Obstetrics; Honorary President of the Belgian Society of Gynecology and Obstetrics; Honorary Fellow of the Gynecological Societies of New York and Chicago; Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Gynecological Society of Paris; Surgeon to the Brussels Polyclinic. 53 Boulevard de Waterloo, Brussels, Belgium.

1905.—MCGRAW, THEODORE A., M.D. 73 Cass Street, Detroit, Mich.

1890.—MARTIN, AUGUST, M.D. Emeritus Professor of Gynecology in the University of Greifswald. Keithstrasse 14, Berlin W. 62, Germany.

1897.—MATHEWS, JOSEPH MCDOWELL, M.D. Professor of Diseases of the Rectum and Clinical Surgery, Hospital College of Medicine; President of the Kentucky State Board of Health; First

Vice-President American Medical Association, 1898; President, 1899. 411 The Masonic, Louisville, Kentucky.

1889.—NICOLAYSEN, JULIUS, M.D. Professor of Surgery in the University of Norway. Christiania, Norway.

1910.—DE OTT, DIMITRIJ OSKAROVIC. Professor of Obstetrics and Gynecology in the Royal Pavloona Clinical Institute of St. Petersburg; President of the Fifth International Congress of Obstetrics and Gynecology. Wassily Ostrow, University Place, St. Petersburg, Russia.

1891.—PIETRANERA, E., M.D. Professor of Obstetrics in the Medical Department of the National University; Director of the Maternity Branch of the Clinical Hospital. 2711 Calle Rio Adaria, Buenos Ayres, Argentine Republic, S. A.

1889.—SCHULTZE, BERNHARD SIGMUND, M.D. Professor of Gynecology; Director of the Lying-In Institute and of the Gynecological Clinic. 2 Sellierstrasse, Jena, Germany.

1890.—SEGOND, PAUL, M.D. Professor of Clinical Surgery of the Faculty of Medicine, Paris; Surgeon to the Salpétrière. 4 Quai Debilly, Paris, France.

1899.—SINCLAIR, SIR WILLIAM JAPP, M.A., M.D. (Aberd.), M.R.C.P. Professor of Obstetrics and Gynecology, Owens College, Victoria University; Physician to the Manchester Southern Hospital for Diseases of Women and Children. Garvock House, Dudley Road, Whalley Range, Manchester, England.

1896.—STERNBERG, GEORGE MILLER, A.M., M.D., LL.D. Surgeon General U. S. Army (Retired). 2005 Massachusetts Avenue, Washington, D. C.

1888.—WILLIAMS, SIR JOHN, BART., M.D., F.R.C.P. Blaen Llynant, Aberystwyth, Cardiganshire, Wales.

Total, twenty-two Honorary Fellows.

HONORARY FELLOWS, DECEASED.

1892.—BOISLINIERE, L. CH., A.B., M.D., L.L.D., Saint Louis, Mo., 1896.

1889.—CHARPENTIER, LOUIS ARTHUR ALPHONSE, M.D., Paris, France, 1899.

1890.—CORSON, HIRAM, M.D., Plymouth Meeting, Pa., 1896.

1889.—DUNLAP, ALEXANDER, A.M., M.D., Springfield, O., 1894.

1888.—EDIS, ARTHUR WELLESLEY, M.D., LOND. F.R.C.S., M.R.S.C.S., London, England, 1893.

1889.—EKLUND, ABRAHAM FREDRIK, M.D., Stockholm, Sweden. 1898.

1891.—FISHER, GEORGE JACKSON, A.M., M.D., Sing Sing, N. Y, 1893.

1896.—GASTON, JAMES MCFADDEN, A.M., M.D., Atlanta, Ga., 1903.

1892.—GREEN, TRAILL, M.D., LL.D., Easton, Pa., 1897.

1889.—KEITH, THOMAS, M.D., London, England, 1896.

1889.—LEOPOLD, G., M.D., Dresden, Germany, 1913.

1894.—MACLEIN, DONALD, M.D., Detroit, Mich., 1903.

1895.—MASTIN, CLAUDIUS HENRY, M.D., LL.D., Mobile, Ala., 1898.

1891.—MOSES, GRATZ ASHE, M.D., Saint Louis, Mo., 1901.

1905.—MYERS, WILLIAM HERSCHEL, M.D., Fort Wayne, Ind., 1907.

1889.—SAENGER, MAX, M.D., Prague, 1903.

1890.—SAVAGE, THOMAS, M.D., F.R.C.S. Eng., Birmingham, England, 1907.

1894.—SLAVIANSKY, KRONID, M.D., St. Petersburg, Russia, 1898.

1888.—SMITH, J. GREIG, M.A., C.M., M.B., F.R.S.E., Bristol, England, 1897.

1899.—STORRS, MELANCTHON, A.M., M.D., Hartford, Conn., 1900.

1888.—TAIT, LAWSON, M.D., LL.D., F.R.C.S.E., Birmingham, England, 1899.

1905.—TAYLOR, WILLIAM HENRY, M.D., *President*, 1888–1889, Cincinnati, Ohio, 1910.

1900.—THORNTON, J. KNOWSLEY, M.B., M.C., Cambridge, England, 1904.

1901.—WEBER, GUSTAV C. E., M.D., LL.D., Willoughby, Ohio, 1912.

1889.—VON WINCKEL, F.M.D., Munich, Germany, 1912.

1905.—WYMAN, WALTER, M.D., Washington, D.C., 1911.

CORRESPONDING FELLOWS.

1899.—BEUTTNER, OSCAR, M.D. Professor of the Faculty of Medicine. 2 Place de la Fasterie, Geneva, Switzerland.

1903.—CROZEL, G., M.D. Professor Libre of Gynecology. Collonges au Mont d'Or (Rhone), France.

1903.—ELLIS, GUILHERME, M.D. Chief Surgeon to the Real Sociedade de Beneficencia Portuguese Hospital. 6 Rua Aurora, S. Paulo, Brazil, S. A.

1891.—GRIFFIN, HERBERT SPOHN, B.A., M.D. Surgeon to Hamilton City Hospital; Examiner in Obstetrics, University of Toronto. 157 Main Street, Hamilton, Ontario, Canada.

1903.—LANE, HORACE MANLEY, M.D., LL.D. President of Mackenzie College, S. Paulo, Brazil. 184 Rua da Consolacao, S. Paulo, Brazil, S. A.

1891.—MACHELL, HENRY THOMAS, M.D., L.R.C.P. Ed. Lecturer on Obstetrics, Women's Medical College; Surgeon to St. John's Hospital for Women; Physician to Victoria Hospital for Sick Children and to Hillcrest Convalescent Home. 95 Bellevue Avenue, Toronto, Ontario, Canada.

1898.—WRIGHT, ADAM HENRY, B.A., M.D. Univ. Toronto, M.R.C.S., Eng. Professor of Obstetrics in the University of Toronto; Obstetrician and Gynecologist to the Toronto General Hospital and Burnside Lying-in Hospital, *President*, 1891. (Transferred from Ordinary List, 1898.) 30 Gerrard Street, East, Toronto, Ont., Canada.

Total, seven Corresponding Fellows.

SENIOR FELLOWS.

1913.—BLUME, FREDERICK, M.D. Transferred from list of Ordinary Fellows. Gynecologist to the Allegheny General Hospital and Pittsburg Free Dispensary; Obstetrician to the Roselia Maternity Hospital; Consulting Gynecologist to the Mercy Hospital; President of the Pittsburg Obstetrical Society, 1892. Office, Jenkins Building, Pittsburg, Pa.

1911.—LINCOLN, WALTER RODMAN, B.A., M.D. Transferred from list of Ordinary Fellows. Lecturer on Gynecology, College of Physicians and Surgeons of Cleveland. Lennox Building, corner Erie Street and Euclid Avenue, Cleveland, Ohio.

1913.—STAMM, MARTIN, M.D. Transferred from list of Ordinary Fellows. Professor of Operative and Clinical Surgery in the College of Physicians and Surgeons, Cleveland. 316 Napoleon Street, Fremont, Ohio.

ORDINARY FELLOWS.

1902.—ABRAMS, EDWARD THOMAS, A.M., M.D. Consulting Surgeon to the Lake Superior General Hospital; Member of the Michigan State Medical Society; Member of the American Medical Association. Surgeon to St. Joseph's Hospital. Dollar Bay, Mich.

1895.—BACON, JOSEPH BARNES, M.D. Professor of Rectal Diseases at the Post-Graduate Medical School; Instructor in Clinical Surgery in the Medical Department of Northwestern University, Chicago. Macomb, Ill.

1911.—BAINBRIDGE, WILLIAM SEAMAN, M.D., A.M., M.S., Sc.D. Adjunct Professor, New York Post-Graduate Medical School, 1902–6; Professor New York Polyclinic Medical School and Hospital since 1906; Surgeon, New York Skin and Cancer Hospital; Attending Surgeon, New York City Children's Hospitals and Schools; Consulting Surgeon, Manhattan State Hospital, New York Home for Dependent Crippled Children, College of Dental and Oral Surgery of New York and Tarrytown Hospital, Tarrytown, N. Y.; Consulting Gynecologist, St. Andrew's Hospital (New York) and St. Mary's Hospital, Jamaica, Long Island and the Ossining Hospital, Ossining, N. Y.; Assistant Surgeon, Medical Reserve Corps, United States Navy; Honorary President International Congress for Study of Tumors and Cancers, Heidelberg, Germany, 1906. 34 Gramercy Place, New York City.

1895.—BALDWIN, JAMES FAIRCHILD, A.M., M.D. Surgeon to Grant Hospital, 125 South Grant Avenue. Residence, 405 E. Town Street, Columbus, Ohio.

1903.—BANDLER, SAMUEL WYLLIS, M.D. Instructor in Gynecology in the New York Post-Graduate Medical School and Hospital; Adjunct Gynecologist to the Beth Israel Hospital. 134 West Eighty-seventh Street, New York, N. Y.

1911.—BARRETT, CHANNING W., M.D. Gynecologist, Chicago Polyclinic School and Hospital; Professor of Gynecology and Clin-

ical Gynecology, College of Physicians and Surgeons, Medical Department, University of Illinois; Attending Surgeon and Gynecologist, Marion Sims Sanitarium; Obstetrician, Cook County Hospital. 446 St. James Place, Chicago.

1913.—BAUGHMAN, GREER, M.D. Associate Professor of Obstetrics, Medical College of Virginia. Residence and Office, 26 North Laurel St., Richmond, Va.

1907.—BELL, JOHN NORVAL, M.D. Adjunct Professor of Obstetrics and Gynecology at Detroit College of Medicine; Gynecologist to Harper Hospital Polyclinic. Residence, 418 Fourth Avenue; Office, 506 Washington Arcade, Detroit, Mich.

1900.—BONIFIELD, CHARLES LYBRAND, M.D. Professor of Clinical Gynecology in the Medical College of Ohio; President of the Cincinnati Academy of Medicine, 1900; Gynecologist to the Good Samaritan, Christ's, and to Speer's Memorial Hospitals; formerly President of the Cincinnati Obstetrical Society; Secretary of the Section on Obstetrics and Gynecology, American Medical Association, 1901–4; Chairman, 1905; *Vice-president*, 1907. Residence, corner Washington and Gholson Avenues; Office, 409 Broadway, Cincinnati, Ohio.

1896.—BOSHER, LEWIS C., M.D. Professor of Practice of Surgery and Clinical Surgery, Medical College of Virginia; Visiting Surgeon, Memorial Hospital, Richmond. 422 East Franklin Street, Richmond, Va.

Founder.—BOYD, JAMES PETER, A.M., M.D. Professor of Obstetrics and Diseases of Children in the Albany Medical College; Consulting Obstetrician and Gynecologist to the Albany Hospital; Fellow of the British Gynecological Society. Fellow of the Royal Society of Medicine. 152 Washington Avenue, Albany, N. Y.

1889.—BRANHAM, JOSEPH H., M.D. Professor of Surgery in the Maryland Medical College; Surgeon to the Franklin Square Hospital. 2200 Eutaw Place, corner Ninth Avenue, Baltimore, Md.

1912.—BROWN, GEORGE VAN AMBER, M.D. Gynecologist, Cystoscopist, German Polyclinic; Gynecologist, Providence Hospital. Residence, 55 Gladstone Ave.; Office, 919–922 J. Henry Smith Bldg., Cor. Griswold and State Sts., Detroit, Michigan.

1894.—BROWN, JOHN YOUNG, M.D. Professor of Clinical Surgery in Saint Louis University; Chief Surgeon to St. John's Hospital; President of the Mississippi Valley Medical Association, 1898; *Vice-president*, 1905; *President*, 1906; *Executive Council*, 1907–8. Residence, 303 North Grand Avenue; Office, 612 Metropolitan Building, Saint Louis, Mo.

1908.—BUTEAU, SAMUEL H., M.D. Former member of California State Board of Medical Examiners; formerly Visiting Surgeon to Almeda County Hospital. Residence, 1052 Telegraph Avenue; Office, 1155 Broadway, Oakland, Cal.

1906.—CANNADAY, JOHN EGERTON, M.D. Surgeon to the Charleston General Hospital; Surgeon to McMillan's Hospital, Charleston; Fellow of the Southern Surgical and Gynecological Association; Non-resident Honorary Fellow of the Kentucky State Medical Association; Fellow West Virginia Medical Association, Virginia Medical Society, American Medical Association, Tri-State Society Virginia and the Carolinas, and American Association of Railway Surgeons. Office, Capital City Bank Building, corner Capital and Virginia Streets, Charleston, W. Va.

Founder.—CARSTENS, J. HENRY, M.D. Professor Abdominal and Pelvic Surgery, Detroit College of Medicine and Surgery, President of the Faculty. Consulting Gynecologist to the Harper Hospital; Cons. Obstetrician to the Woman's Hospital; Consulting Obstetrician to the House of Providence; Ex-President Michigan State Medical Society; Ex-President Mississippi Valley Medical Society; Ex-Chairman Section of Obstetrics, A. M. A.; Member Royal Society of Medicine; Member American College of Surgeons; etc., etc. President of the Detroit Gynecological Society, 1892. *Vice-president*, 1888–89; *President*, 1895; *Executive Council*, 1896–98. 620 Woodward Avenue, Detroit, Mich.

1895.—CHASE, WALTER BENAJAH, M.D. Visiting surgeon to the Bethany Deaconess Hospital; Consulting Obstetrician and Gynecologist to the Long Island College Hospital; Consulting Gynecologist to the Nassau Hospital, Mineola L. I.; Consulting Gynecologist to the Jamaica Hospital; President of the Council of the Long Island College Hospital; Fellow of the Brooklyn Gynecological Society (President, 1893); Member Medical Society County of Kings (President, 1892); Permanent Member Medical Society State of New York; Member of the Brooklyn Pathological

Society; Member of the Associated Physicians of Long Island; and Honorary Member of the Queens County Medical Society; *Executive Council*, 1899–1904. 1050 Park Place, Borough of Brooklyn, New York.

1904.—CONGDON, CHARLES ELLSWORTH, M.D. Gynecologist to the City Hospital for Women. Office, 859 Humboldt Parkway,

1901.—CRILE, GEORGE W., A.M., M.D. Professor of Clinical Surgery in the Western Reserve University Medical College; Surgeon to St. Alexis's Hospital; Associate Surgeon to Lakeside Hospital. *Vice-president*, 1907. Residence, 6203 Euclid Avenue; Office, Osborn Building, Cleveland, Ohio.

1912.—CROTTI, ANDRE, M.D. Surgeon Grant Hospital and Children's Hospital. Residence, 1728 E. Broad Street; Office, 151 E. Broad Street, Columbus, Ohio.

1905.—CROSSEN, HARRY STURGEON, M.D. Clinical Professor of Gynecology in Washington University; Gynecologist to Washington University Hospital; Associate Gynecologist to Mullanphy Hospital; Consulting Gynecologist to Bethesda, City and Female Hospitals. Residence, 4477 Delmar Avenue; Office, 310 Metropolitan Building, Saint Louis, Mo.

1912.—DARNALL, WILLIAM EDGAR, A.B., M.D. Gynecologist, Atlantic City Hospital; Consulting Surgeon to North American Children's Sanitarium for the Treatment of Surgical Tuberculosis, and Home for Incurables, Longport, New Jersey. Residence and Office, 1704 Pacific Ave., Atlantic City, N. J.

1911.—DAVIS, ASA BARNES, M.D. Attending Surgeon of the Society of the Lying-in Hospital of the City of New York; Consulting Gynecologist to the Vassar Brother's Hospital, Poughkeepsie, N. Y. 42 E. 35th Street, New York.

1903.—DAVIS, JOHN D. S., M.D., LL.D. Professor of Surgery in the Birmingham Medical College; Surgeon to Hillman Hospital; ex-President of Jefferson County Medical Society and of the Board of Health of Jefferson County. *Vice-president*, 1909. 2031 Avenue G., Birmingham, Ala.

1896.—DEAVER, JOHN BLAIR, M.D. Professor of Clinical Surgery at the University of Pennsylvania; Surgeon in Chief to the German Hospital; Consulting Surgeon to the Germantown Hospital. 1634 Walnut Street, Philadelphia, Pa.

1910.—DICE, WILLIAM GORDON, A.B., M.D. Obstetrician to Flower Hospital. 240 Michigan Street, Toledo, Ohio.

1909.—DICKINSON, GORDON K., M.D. Surgeon to the City and Christ Hospitals; Consulting Surgeon to Bayonne Hospital. Consulting Surgeon, Stumpf Memorial Hospital, Kearny, N. J. 280 Montgomery Street, Jersey City, N. J.

1892.—DORSETT, WALTER BLACKBURN, M.D., F.A.C.S. Professor of Gynecology and Pelvic Surgery, St. Louis University School of Medicine; Gynecologist to the Evangelical Deaconess Hospital, Missouri Baptist Sanitarium and Rebeckah Hospital. Consulting Gynecologist to St. John's Hospital; Member of the Southern Surgical and Gynecological Society, Western Surgical Society, Southwestern Medical Association, St. Louis Surgical Society, St. Louis Surgical Club, Alumni Medical Society of the St. Louis City Hospital, St. Louis Academy of Science. President of the Missouri State Medical Society, 1892; President of the Missouri State Medical Association, 1900. Vice-president of the Western Surgical Society, 1912. Vice-president of the Southwestern Medical Association, 1913. Chairman of the Section on Obstetrics and Diseases of Women, American Medical Association, 1907. *Vice-president*, 1898; *President*, 1904; *Executive Council*, 1905–1907. Office, 409–412 Wall Building, St. Louis, Mo.

1899.—EASTMAN, THOMAS BARKER, A.B., M.D. Professor of the Medical and Surgical Diseases of Women, Central College of Physicians and Surgeons; Gynecologist to the City Hospital, City Dispensary, and Central Free Dispensary. 309 Pennway Building, Indianapolis, Ind.

1904.—ELBRECHT, OSCAR H., M.D. Visiting Surgeon to St. Louis City Hospital and Allied Institutions; Consulting Surgeon to Bethesda Hospital; Consulting Surgeon to St. Louis Maternity Hospital and Chief of Staff. Office, Nos. 423–25 Metropolitan Bldg., St. Louis, Mo.

1906.—ERDMANN, JOHN FREDERICK, M.D. Professor of Surgery, N. Y. Post-Graduate Hospital and Medical School; Attending Surgeon to Gouverneur Hospital and Post-Graduate Hospital; Consulting Surgeon to St. John's Riverside Hospital, Yonkers, N. Y.; Mt. Vernon General Hospital, Mt. Vernon, N. Y.; Greenwich General Hospital, Greenwich, Conn.; Nassau Hospital, Mineola, L. I. 60 West Fifty-second Street, New York, N. Y.

1911.—FINDLEY, PALMER, B.E., M.D. Professor of Gynecology, College of Medicine, University of Nebraska. 418 Brandeis Theater Building, Omaha, Neb.

1910.—FOSTER, CURTIS SMILEY, A.B., M.D. Gynecologist to the Western Pennsylvania Hospital, Pittsburg. Residence, 5749 Ellsworth Avenue; Office, 308 Diamond Bank Building, Pittsburg, Pa.

1903.—FRANK, LOUIS, M.D. Professor of Abdominal and Pelvic Surgery, Medical Department, University of Louisville; Surgeon Louisville City Hospital; Surgeon to John N. Norton Memorial Infirmary; President Mississippi Valley Medical Association, 1912; *Executive Council*, 1913. Residence, 1321 Fourth Ave.; Office, 400 The Atherton, Louisville, Kentucky.

1913.—FREELAND, JAMES ROY, M.D. Obstetrician to Western Pennsylvania Hospital, Pittsburg, Pa. Residence and Office, 4715 Fifth Ave., Pittsburg, Pa.

1912.—FURNISS, HENRY DAWSON, M.D. Adjunct Professor of Gynecology, New York Post-Graduate Medical School; Assistant Attending Gynecologist New York Post-Graduate Hospital; Assistant Attending Gynecologist New York Red Cross Hospital; Fellow New York Post-Graduate Clinical Society, Honorary Life Member Dallas County, Ala., Medical Society, New York Academy of Medicine, New York Medico-Surgical Society, New York Obstetrical Society, New York State and County Medical Societies, American Medical Association, American Urological Society. Residence, 393 West End Ave.; Office, 375 West End Avenue, New York, N. Y.

1902.—GILLETTE, WILLIAM J., M.D. Professor of Abdominal Surgery and Gynecology in the Toledo Medical College; Surgeon to Robinwood Hospital. 1613 Jefferson Street, Toledo, Ohio.

1895.—GOLDSPOHN, ALBERT, M.S., M.D. Professor of Gynecology, Post-Graduate Medical School; Surgeon in Chief of Evangelical Deaconess Hospital. *Vice-president*, 1901. Residence, 2118, Office, 2120 Cleveland Avenue, Chicago, Ill.

1912.—GOODMAN, SYLVESTER JACOB, PH.G., M.D. Surgeon and Obstetrician Grant Hospital; Lecturer of Obstetrics; Training School for Nurses, Grant Hospital; Consulting Surgeon, Actor's

Fund of America, etc., etc. Residence and Office 238 State Street, Columbus, Ohio.

1913.—GRAY, FRANK D., M.E.D., M.D. Visiting Surgeon to Christ and the City Hospitals, Jersey City; Consulting Surgeon to North Hudson Hospital, Weehawken State Hospital for Insane, Morris Planes, N. J.; State Village for Epileptics, Skillman, N. J.; First Vice-president New Jersey State Medical Society. Residence and Office, 62 Madison Ave., Jersey City, N. J.

1913.—HADDEN, DAVID, B.S., M.D. Residence, 2716 Telegraph Ave., Berkeley; Office, Oakland Bank of Savings Bldg., Oakland, Cal.

1900.—HAGGARD, WILLIAM DAVID, JR., M.D. Professor of Gynecology, Medical Department University of Tennessee; Professor of Gynecology and Abdominal Surgery, University of the South (Sewanee); Gynecologist to the Nashville City Hospital; President of the Nashville Academy of Medicine; Secretary of the Section on Diseases of Women and Obstetrics, American Medical Association, 1898; Fellow (and Secretary) of the Southern Surgical and Gynecological Association; Member of the Alumni Association of the Woman's Hospital, N. Y. *Vice-president*, 1904. 148 Eighth Avenue, North, Nashville, Tenn.

1906.—HALL, JOSEPH ARDA, M.D. Clinical Assistant in Gynecology at the Miami Medical College, Cincinnati. 628 Elm Street, Cincinnati, Ohio.

1889.—HALL, RUFUS BARTLETT, A.M., M.D. Professor of Clinical Gynecology in the Ohio-Miami Medical College, Medical Department of University of Cincinnati; Gynecologist to the Cincinnati Hospital; Surgeon in charge of the Hall Hospital; Member of the British Medical Society; of the Southern Surgical and Gynecological Association; of the American Medical Association; of the Ohio State Medical Society (President, 1900); of the Cincinnati Academy of Medicine (President, 1909); of the Cincinnati Obstetrical Society (Ex-President). *Vice-president*, 1891; *President*, 1900; *Executive Council*, 1904–1909. Berkshire Building, 628 Elm Street, Cincinnati, Ohio.

1902.—HAMILTON, CHARLES SUMNER, A.B., M.D. Professor of the Principles of Surgery in Sterling Medical College; Surgeon to Mt. Carmel and the Children's Hospitals. 142 South Garfield Street, Columbus, Ohio.

1910.—HARRAR, JAMES AITKEN, M.D. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence and Office 29 East Seventy-seventh Street, New York, N. Y.

1894.—HAYD, HERMAN EMIL, M.D., M.R.C.S. Eng. Surgeon to the German Deaconess Hospital; Surgeon to the German Hospital. *Vice-president*, 1903; *Executive Council*, 1908–1910; *President*, 1911. 493 Delaware Avenue, Buffalo, N. Y.

1908.—HEDGES, ELLIS W., A.B., M.D. Visiting Surgeon to Muhlenberg Hospital, Plainfield, N. J. 703 Watchung Avenue, Plainfield, N. J.

1910.—HILL, ISADORE LEON, A.B., M.D. Clinical Instructor of Obstetrics at Cornell University Medical College; Visiting Obstetrician to the Red Cross Hospital; Attending Obstetrician to Sydenham Hospital. 616 Madison Avenue, New York, N. Y.

1891 —HOWITT, HENRY, M.D., M.R.C.S. Eng. Surgeon to the Guelph General and St. Joseph's Hospital, Guelph; Member of the British and Ontario Medical Associations; Medical Health Officer for the City of Guelph. Examiner in Obstetrics and Gynecology for the Ontario Medical Council 1892–1898. *Vice-president*, 1895. 221 Woolwich Street, Guelph, Ontario, Canada.

1905.—HUGGINS, RALEIGH RUSSELL, M.D. Surgeon to St. Francis Hospital. *Vice-president*, 1910. 1018 Westinghouse Building, Pittsburg, Pa.

1895.—HUMISTON, WILLIAM HENRY, M.D. Associate Professor of Gynecology in the Medical Department of Western Reserve University; Gynecologist in Chief to St. Vincent's Charity Hospital; Consulting Gynecologist to the City Hospital; President of the Ohio State Medical Society, 1898. *Executive Council*, 1902–1903, 1908, 1910–1911. *President*, 1909. Residence, 2041 East Eighty-ninth Street; Office, 536 Rose Building, Cleveland, Ohio.

1901.—ILL, CHARLES L., M.D. Surgeon to the German Hospital; Assistant Gynecologist to St. Michael's and St. Barnabas's Hospitals; Obstetrician to St. Barnabas's Hospital, Newark; Assistant Gynecologist to All Souls' Hospital, Morristown. 188 Clinton Avenue, Newark, N. J.

Founder.—ILL, EDWARD JOSEPH, M.D. Surgeon to the Woman's Hospital; Medical Director of St. Michael's Hospital; Gynecologist

and Supervising Obstetrician to St. Barnabas's Hospital; Consulting Gynecologist to the German Hospital and the Bnoth Israel Hospital of Newark, N. J., to All Souls' Hospital, Morristown, N. J., and to the Mountain Side Hospital, Montclair, N. J.; Member of the Southern Surgical and Gynecological Association; Vice-president from New Jersey of the Pan-American Medical Congress of 1893; President of the Medical Society of the State of New Jersey, 1907. *Vice-president*, 1893; *President*, 1899; *Executive Council*, 1901–1903. 1002 Broad Street, Newark, N. J.

1909.—JACOBSON, JULIUS H., M.D. Professor of Gynecology and Clinical Surgery, Medical Department Toledo University; Surgeon to Lucas City Hospital; Gynecologist to St. Vincent's Hospital, Toledo. 2050 Franklin Street, Toledo, O.

1910.—JENKS, NATHAN, B.S., M.D. Lecturer on Obstetrics at the Detroit College of Medicine; Visiting Physician to the Woman's Hospital and Infant's Home; Visiting Obstetrician to the New Providence Hospital, Detroit. Residence, 231 Burns Street; Office, David Whitney Building, Detroit, Mich.

1906.—JONAS, ERNST, M.D. Clinical Professor of Surgery in Washington University Medical School; Surgeon in Charge of the Surgical Clinic at the Washington University Hospital; Gynecologist to the St. Louis Jewish Hospital; Visiting Surgeon to St. Louis City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Martha Parsons Free Hospital for Children. Residence, 4495 Westminster Place; Office, 465 North Taylor Avenue, St. Louis, Mo.

1910.—JONES, ARTHUR THOMAS, M.D. Visiting Gynecologist to St. Joseph's Hospital, Providence; Visiting Surgeon to Memorial Hospital, Pawtucket, R. I.; Visiting Surgeon to Rhode Island State Hospital for the Insane, Howard, R. I.; Consulting Surgeon to Woonsocket Hospital, Woonsocket, R. I. 81 Elm Grove Avenue, Providence, R. I.

1902.—KEEFE, JOHN WILLIAM, M.D. Attending Surgeon to the Gynecological Department of St. Joseph's Hospital; Attending Surgeon to the Rhode Island Hospital; Consulting Surgeon to the Providence Lying-in Hospital. *Vice-president*, 1908. *Executive Council*, 1911. 259 Benefit Street, Providence, R. I.

1910.—KENNEDY, JAMES W., M.D. Associate Gynecologist and Obstetrician to the Philadelphia Dispensary. 1409 Spruce Street, Philadelphia, Pa.

1911.—KING, JAMES E., M.D. Professor of Clinical Gynecology, Medical Department, University of Buffalo, New York; Attending Gynecologist, Buffalo General and Erie County Hospital and Good Samaritan Dispensary; Fellow Royal Society of Medicine, London, England. 1248 Main Street, Buffalo, N. Y.

1908.—KIRCHNER, WALTER C. G., A.B., M.D. Formerly Superintendent and Surgeon in charge of the St. Louis City Hospital. Visiting Surgeon City Hospital, Consulting Surgeon St. John's Hospital. Office, Metropolitan Building, St. Louis, Mo.

1898.—LANGFITT, WILLIAM STERLING, M.D. Surgeon in chief to St. John's Hospital. Office, 8047 Jenkins Building, Pittsburg, Pa.

1910.—LOBENSTINE, RALPH WALDO, A.B., M.D. Attending Surgeon to the Lying-in Hospital of the City of New York; Gynecologist to Bellevue Hospital Dispensary. Residence, 780 Madison Avenue; Office, 162 East Seventy-first Street, New York, N. Y.

1890.—LONGYEAR, HOWARD WILLIAMS, M.D. Professor of Gynecology and Abdominal Surgery in the Detroit Post-Graduate Medical School; Clinical Professor of Gynecology in the Detroit College of Medicine; Gynecologist to Harper Hospital; Physician to the Woman's Hospital; President of the Detroit Gynecological Society, 1889; Chairman of the Section on Obstetrics and Gynecology of the Michigan State Medical Society, 1892. *Vice-president*, 1893; *President*, 1905; *Executive Council*, 1906–1908. 271 Woodward Avenue, Detroit, Mich.

1911.—LOTHROP, EARL P., A.B., M.D. Gynecologist to the Buffalo Woman's Hospital; Consulting Surgeon to Columbus Hospital, Buffalo; Surgeon to the J. N. Adam Memorial Hospital for Tuberculosis, Perrysburg, N. Y. 153 Delaware Avenue, Buffalo, N. Y.

1910.—LOTT, HENRY STOKES, M.D. 123 Cherry Street, Winston, N. C.

1913.—LYNCH, JEROME MORLEY, M.D. Professor Rectal and Intestinal Diseases, New York Polyclinic; Consulting Surgeon Nassau Hospital, Mineola, L. I.; Attending Surgeon St. Mary's

Hospital, Hoboken, N. J.; Member New York State and County Societies, American Medical Association, American Proctologic Society, North Western Medical and Surgical Society; Surgeon Medical Reserve, U. S. N. Residence and Office, 57 East Fifty-second St., New York City.

1896.—LYONS, JOHN ALEXANDER, M.D. Instructor in Gynecology at the Post-Graduate Medical School; Gynecologist and Lecturer to Nurses at the Chicago Hospital. Residence, 6848 Anthony Avenue; Office, 4118 State Street, Chicago, Ill.

1910.—MCCLELLAN, BENJAMIN BUSH, A.B., M.D. Member American Medical Association; ex-President Ohio State Medical Society; Surgeon to McClellan Hospital. Residence, 636 South Detroit Street; Office, 7 East Second Street, Xenia, Ohio.

Founder.—MCMURTRY, LEWIS SAMUEL, A.M., M.D., LL.D. Professor of Gynecology in the Hospital College of Medicine; Gynecologist to Sts. Mary and Elizabeth Hospital; Fellow of the Edinburgh Obstetrical Society; Fellow of the British Gynecological Society; Corresponding Member of the Obstetrical Society of Philadelphia and of the Gynecological Society of Boston; Member (President, 1891) of the Southern Surgical and Gynecological Association; President American Medical Association, 1905. *Executive Council*, 1891–1892, 1895–1905; *President*, 1893. Suite 542, The Atherton, Louisville, Ky.

1910.—MCPHERSON, ROSS, A.B., M.D. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence, 26 Grammercy Park, East; Office, 20 West Fiftieth Street, New York, N. Y.

Founder.—MANTON, WALTER PORTER, M.D. Professor of Obstetrics and Clinical Gynecology, Detroit College of Medicine and Surgery; Gynecologist to Harper Hospital and the Pontiac and Traverse City State Hospitals; Consulting Gynecologist to St. Joseph's Retreat; President of the Medical Board and Visiting Obstetrician Woman's Hospital and Infants' Home; President Detroit Academy of Medicine, 1892–1894; President Detroit Gynecological Society, 1890; President Wayne County Medical Society, 1908–1909; Chairman, Section on Obstetrics and Diseases of Women, 1909; Fellow of the Royal Medical Society, the American Gynecological Society, the American College of Surgeons; the Zoological Society of London, etc. *Vice-president*, 1894. 32 Adams Avenue, W., Detroit, Mich.

1911.—MARVEL, EMERY, M.D. Chief Surgeon and Gynecologist, Private Hospital Association's Atlantic City Consulting Surgeon and Gynecologist, Jewish Seashore Home, Atlantic City, 1801 Pacific Avenue, Atlantic City, N. J.

Founder.—MILLER, AARON BENJAMIN, M.D. Professor of Gynecology in the Medical Department of Syracuse University; Gynecologist to St. Joseph's Hospital, House of the Good Shepherd and Dispensary. *Vice-president*, 1899, 1904; *President*, 1910; *Executive Council*, 1911. 326 Montgomery Street, Syracuse, N. Y.

1905.—MILLER, JOHN D., M.D. Assistant to the Chair of Clinical Gynecology in the Medical College of Ohio, University of Cincinnati; Gynecologist to the Good Samaritan Hospital. N. E. Corner Clifton Avenue and W. McMillan Street, Cincinnati, Ohio.

1911.—MOOTS, CHARLES W., B.S., M.D. Gynecologist to Flower Hospital; President of Academy of Medicine of Toledo and Lucas County, 1912. Residence, River Road, R.F.D. No. 4; Office, 347 The Nicholas, Toledo, O.

1907.—MORIARTA, DOUGLAS C., M.D. Senior Surgeon to Saratoga Hospital; Surgeon in chief to Saint Christian Hospital for Children; Director of State Experimental Station at Saratoga. 511 Broadway, Saratoga Springs, N. Y.

1904.—MORRIS, LEWIS COLEMAN, M.D. Professor of Gynecology and Abdominal Surgery in the Birmingham Medical College; Secretary, Medical Association State of Alabama, 1904; Member of Jefferson County Board of Health. *Vice-president*, 1911. 1203 Empire Building, Birmingham, Ala.

1890.—MORRIS, ROBERT TUTTLE, A.M., M.D. Professor of Surgery in the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1892; *Executive Council*, 1906, 1908–1911; *President*, 1907. 616 Madison Avenue, New York, N. Y.

1894.—MURPHY, JOHN BENJAMIN, A.M., M.D., LL.D., F.R.C.S. (Eng.). Professor of Surgery and Head of the Department Northwestern University; Chief Surgeon to Mercy Hospital and St. Joseph's Hospital; Attending Surgeon to Columbus, Alexian Brothers and Cook County Hospitals; President of the American Medical Association, 1911. Residence, 3305 Michigan Avenue; Office, 800 Monroe Building, 104 S. Michigan Avenue, Chicago, Ill.

1896.—NOBLE, GEORGE HENRY, M.D. Gynecologist to the Grady Hospital; Secretary to the Section on Obstetrics and Gynecology of American Medical Association, 1897; Member of the Southern Surgical and Gynecological Association. 186 South Pryor Street, Atlanta, Ga.

1903.—NOBLE, THOMAS BENJAMIN, M.D. Professor of Abdominal Surgery in the Central College of Physicians and Surgeons; Consultant in the Diseases of Women at the City Hospital, City Dispensary, and Protestant Deaconess's Hospital, Indianapolis. 427 Newton Claypool Building, Indianapolis, Ind.

1907.—OLMSTED, INGERSOLL, M.D. Surgeon to the City and St. Joseph's Hospitals, Hamilton, Ont. 215 South James St., Hamilton, Ontario, Canada.

1899.—PANTZER, HUGO OTTO, M.D. Professor of Clinical Gynecology in the Indiana Medical College, Medical Department of Purdue University; Gynecologist to City Hospital, City Dispensary, St. Vincent's and Deaconess's Hospitals; Member of Indianapolis, Indiana State, Ohio Valley, Mississippi Valley, Medical Associations and Indianapolis Gynecological Association. *Executive Council*, 1907–1911. 224 North Meridian Street, Indianapolis, Ind.

1890.—PEARSON, WILLIAM LIBBY, M.D. 713 Union Street, Schenectady, N. Y.

1899.—PFAFF, ORANGE G., M.D. Adjunct Professor of Obstetrics and Diseases of Women in the Medical College of Indiana; Gynecologist to the City, Deaconess's, and St. Vincent's Hospitals. 1337 North Pennsylvania Street, Indianapolis, Ind.

1898.—PORTER, MILES F., M.D. Surgeon to Hope Hospital; Professor of Surgery in the Indiana University School of Medicine; ex-President Indiana State Medical Society. *Vice-president*, 1902; *President* 1912–1913. 207 West Wayne Street, Fort Wayne, Ind.

1903.—POUCHER, JOHN WILSON, M.D. Consulting Surgeon to Vassar Brothers Hospital, Poughkeepsie. 339 Mill Street, Poughkeepsie, N. Y.

1904.—REDER, FRANCIS, M.D. Surgeon to Missouri Baptist Sanitarium; Surgeon to St. John's Hospital; Visiting Surgeon to St. Louis City Hospital, and allied Institutions. Residence, 6346 Berlin Avenue; Office, 518–519 Delmar Building, St. Louis, Mo.

Founder.—REED, CHARLES ALFRED LEE, A.M., M.D. Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery and in the Woman's Medical College of Cincinnati; Surgeon to the Cincinnati Free Surgical Hospital for Women; Secretary-General of the First Pan-American Medical Congress, 1893; Member of the Southern Surgical and Gynecological Association; Fellow of the British Gynecological Society; President of the American Medical Association, 1901. *Executive Council*, 1890–1897; *President*, 1898. Rooms 60 and 62, The Groton, N. E. corner Seventh and Race Streets, Cincinnati, Ohio.

1913.—RONGY, ABRAHAM JACOB, M.D. Attending Gynecologist, Lebanon Hospital; Attending Surgeon, Jewish Maternity Hospital; Consulting Gynecologist, Rockaway Beach Hospital. Residence and Office, 154 Henry Street, New York City.

1909.—ROSENTHAL, MAURICE I., M.D. Surgeon to Saint Joseph's Hospital. 336 W. Berry Street, Fort Wayne, Ind.

1902.—RUNYAN, JOSEPH PHINEAS, M.D. Division Surgeon to the Choctaw, Oklahoma and Gulf Railroad; Secretary of the Arkansas State Medical Association, President, 1904. 1514 Schiller Avenue, Little Rock, Ark.

1906.—RUTH, CHARLES EDWARD, M.D. Professor of Surgery and Clinical Surgery in the Keokuk Medical College (College of Physicians and Surgeons); Surgeon to the Chicago and Rock Island Pacific Railway. Des Moines, Iowa.

1903.—SADLIER, JAMES EDGAR, M.D. Consulting Surgeon to Highland Hospital, Poughkeepsie. *Vice-president*, 1909. 295 Mill Street, Poughkeepsie, N. Y.

1909.—SANES, K. ISADORE, Gynecologist to the West Penn Hospital; Consulting Gynecologist to the Montefiore Hospital, Pittsburg. Residence, 234 McKee Place; Office, Jenkins Building, Pittsburg, Pa.

1910.—SCHILDECKER, CHARLES BUSHFIELD, M.D. Assistant Gynecologist to Western Pennsylvania Hospital; Coroner's Physician of Allegheny County. Residence, 414 Rebecca Street; Office, 1105 Park Building, Pittsburg, Pa.

1904.—SCHWARZ, HENRY, M.D. Professor of Obstetrics, Medical Department of Washington University. *Vice-president*, 1911. 440 North Newstead Avenue, St. Louis, Mo.

1901.—SCOTT, N. STONE, A.M., M.D. Professor of Surgery, College of Physicians and Surgeons, Cleveland; Consulting Surgeon to City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Out-patient Department of Cleveland General Hospital. Residence, 531 Prospect Avenue; Office, 603–604 Citizens' Building, Cleveland, Ohio.

1895.—SELLMAN, WILLIAM ALFRED BELT, M.D. Gynecologist to The Biedler and Sellman Sanitarium; Member of the Medical and Chirurgical Faculty of Maryland; also of the Baltimore City Medical Society; also of the American Medical Association; the Gynecological and Obstetrical Association of Baltimore; Physician to The Margaret J. Bennett Home for Young Ladies. *Vice-president*, 1908; *Executive Council*, 1909–1910. 5 East Biddle Street, Baltimore, Maryland.

1908.—SHERRILL, JOSEPH GARLAND, A.M., M.D. Professor of Surgery and Clinical Surgery at the University of Louisville. Office, Suite 542, The Atherton, Louisville, Ky.

1899.—SIMPSON, FRANK FARROW, A.B., M.D. Gynecologist to the Allegheny General Hospital; Consulting Gynecologist to the Columbia Hospital. *Vice-president*, 1906. Jenkins Building, Pittsburg, Pa.

1912.—SKEEL, ARTHUR JULIUS, M.D. Assistant Professor of Obstetrics, Western Reserve University; Obstetrician to City Hospital; Associate Obstetrician to St. Luke's Hospital; Consulting Obstetrician to the Florence Crittenden Home; Consulting Obstetrician to the Woman's Hospital. Residence and Office, 1834 East 65th Street, Cleveland, Ohio.

1901.—SKEEL, ROLAND EDWARD, M.D. Associate Clinical Professor of Gynecology in Western Reserve University; Gynecologist to St. Luke's, City, and Lutheran Hospitals; Consulting Surgeon to the Lakewood Hospital. 314 Osborn Building, Cleveland, O.

1910.—SMEAD, LEWIS FREDERIC, A.B., M.D. Surgeon to St. Vincent's Hospital, Toledo. Residence, 2921 Parkwood Avenue; Office, 242 Michigan Street, Toledo, Ohio.

1891.—SMITH, CHARLES NORTH, M.D. Surgical Chief of Flower Hospital; Gynecologist to St. Vincent's Hospital; *Vice-president*, 1910, 234 Michigan Street, Toledo, Ohio.

1913.—SMITH, LEWIS WATSON, A.B., M.D. Assistant Gynecologist, Allegheny General Hospital; Gynecologist, Pittsburg Free Dispensary. Residence and Office, 6024 Station St., Pittsburg, Pa.

1904.—SMITH, WILLIAM S., M.D. Professor of Gynecology in the Maryland Medical College; Gynecologist to Franklin Square Hospital. 528 Hanover Street, Baltimore, Md.

1902.—STARK, SIGMAR, M.D. Professor of Obstetrics and Clinical Gynecology in the Cincinnati College of Medicine and Surgery; Gynecologist to the Jewish Hospital. 1108 East McMillan Street, Cincinnati, Ohio.

1908.—STEWART, DOUGLAS HUNT, M.D. Residence, 128 West 6th Street, New York, N. Y.

1911.—STILLWAGEN, CHARLES A., M.D. 524 Pennsylvania Avenue, Pittsburg, Pa.

1904.—SUTCLIFFE, JOHN ASBURY, A.M., M.D. Professor of Genitourinary Surgery; Indiana School of Medicine; Consulting Surgeon to St. Vincent's Infirmary; Consultant in Genitourinary Diseases to the City Hospital and to the Protestant Deaconess's Hospital. Residence, 1121 Central Avenue; Office, 155 East Market Street, Indianapolis, Ind.

1899.—SWOPE, LORENZO W., M.D. Surgeon to the Consolidated Traction Company; Chief Surgeon to Wabash Railroad, Pittsburg Division; Surgeon to Western Pennsylvania Hospital; Surgeon to Passavant Hospital; Member of the Allegheny County Medical Society; Member of the American Medical Association. Residence, 4629 Bayard Street; Office, 1105 Park Building, Pittsburg, Pa.

1901.—TATE, MAGNUS ALFRED, M.D. Professor of Obstetrics Miami Medical College; President Cincinnati Academy of Medicine, 1905. 19 West Seventh Street, Cincinnati, Ohio.

1908.—TORRANCE, GASTON, M.D. Surgeon to St. Vincent's and the Hillman Hospitals in Birmingham. Residence, 1626

Eleventh Avenue, South; Office, 325 Woodward Building, Birmingham, Ala.

1912.—TULEY, HENRY ENOS, A.B., M.D. Secretary Mississippi Valley Medical Association. Residence, 3 Magnolia Apts; Office, 705 South Third Street, Louisville, Ky.

1907.—VANCE, AP MORGAN, M.D. Surgeon to Kentucky Masonic Widow's and Orphan's Home and Infirmary; Surgeon to Sts. Mary and Elizabeth Hospital, Louisville. 835 South Fourth Avenue, Louisville, Ky.

Founder.—VANDER VEER, ALBERT, A.M., M.D., Ph.D., LL.D; Professor of Surgery, Albany Medical College; Surgeon-in-Chief. Albany Hospital; Consulting Surgeon, South End Dispensary, Consulting Surgeon, Benedictine Hospital, Kingston, N. Y.; Con; sulting Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y.- Fellow of the American Surgical Association (President, 1906); Fellow of the British Gynecological Society; Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Boston Gynecological Society. *Executive Council*, 1889–1891, 1895–1905; *President*, 1892. 28 Eagle Street, Albany, N. Y.

1913.—VANDER VEER, EDGAR ALBERT, Ph. D., M.D. Professor of Abdominal and Clinical Surgery, Albany Medical College; Attending Surgeon, Albany Hospital. Residence, 150 State Street; Office, 28 Eagle Street, Albany, N. Y.

1912.—VAN SWERINGEN, BUDD, M.D. 208 Washington Boulevard, Fort Wayne, Indiana.

1909.—WADE, HENRY ALBERT, M.D. Surgeon to Bethany Deaconess's Hospital; Associate Gynecologist to Williamsburg Hospital, Brooklyn. 495 Greene Avenue, Brooklyn, N. Y.

1909.—WALDO, RALPH, M.D. Gynecologist to Lebanon Hospital; Associate Surgeon to the Woman's Hospital of the State of New York. 54 W. 71st Street, New York, N. Y.

1891.—WALKER, EDWIN, M.D., Ph.D. Gynecologist to the Evansville City Hospital; President of the Indiana State Medical Society, 1892; Member of the American Medical Association and of the Mississippi Valley Medical Association; Member of the Southern Surgical and Gynecological Association; First Vice-presi-

dent American Medical Association, 1907. *Vice-president*, 1901. 712 South Fourth Street, Evansville, Ind.

1907.—WEISS, EDWARD ALOYSIUS, M.D. Gynecologist to Mercy Hospital; Gynecologist to Presbyterian Hospital; Obstetrician to Rosalia Maternity Hospital; Assistant Professor of Gynecology at University of Pittsburg, Medical Department. 714 Jenkins Building, Pittsburg, Pa.

1889.—WENNING, WILLIAM HENRY, A.M., M.D. Clinical Professor of Gynecology at the Miami Medical College; Chief of Staff and Gynecologist to St. Mary's Hospital. 5 Garfield Place, Cincinnati, Ohio.

Founder.—WERDER, XAVIER OSWALD, M.D. Professor of Gynecology at the University of Pittsburg, Medical Department; Gynecologist to Mercy Hospital. *Treasurer*, 1888–1911. *President*, 1911. 714 Jenkins Building, Pittsburg, Pa.

1904.—WEST, JAMES NEPHEW, M.D. Professor of Diseases of Women and Secretary of the Faculty at the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1906. 71 West Forty-ninth Street, New York.

1896.—WESTMORELAND, WILLIS FOREMAN, M.D. Professor of Surgery at the Atlanta Medical College. Suite 241, Equitable Building, Atlanta, Ga.

1911.—WHITE, GEORGE R., B.S., M.D. Surgeon Park View Sanitarium. 2 Liberty E., Savannah, Ga.

1909.—YATES, H. WELLINGTON, M.D. Gynecologist to St. Mary's Hospital; Gynecologist to Providence Hospital; Assistant Professor of Gynecology, Detroit College of Medicine and Surgery; Member of the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association; Member of the Staff of St. Luke's Hospital; Member of the Wayne County and Michigan State Medical Society; President Detroit Medical Club; Medical Director of the Peninsular Life Insurance Co. Residence, 1360 Fort Street, West; Office, 607 Gas Office Building, Detroit, Mich.

1907.—ZIEGLER, CHARLES EDWARD, A.M., M.D. Professor of Obstetrics in the University of Pittsburg; Medical Director of the Elizabeth Steele Magee Hospital for Women; Medical Director of the Pittsburg Maternity Dispensary; Consulting Obstetrician to

the Columbia Hospital and Consulting Obstetrician and Gynecologist to the Dixmont Hospital for the Insane. Forbes and Halket Streets, Pittsburg, Pa.

1900.—ZINKE, ERNST GUSTAV, M.D. Professor of Obstetrics and Clinical Midwifery in the Ohio-Miami Medical College, University of Cincinnati, Chief of Staff and Obstetrician and Gynecologist to the German Hospital; Obstetrician to the Maternity Hospital; President of Cincinnati Obstetric Society, 1887; President Academy of Medicine of Cincinnati, 1894; First Vice-president Ohio State Medical Society; Member and Chairman of Section on Obstetrics, Gynecology and Abdominal Surgery, of American Medical Association; Fellow of Southern Surgical and Gynecological Association. Honorary Member Jackson County Medical Society, Kansas City, Mo. *President*, 1908; *Executive Council*, 1909–1911. *Secretary*, 4 Seventh Avenue, West, Cincinnati, Ohio.

Total, one hundred and thirty-three Ordinary Fellows.

ORDINARY FELLOWS, DECEASED.

1890.—ASDALE, WILLIAM JAMES, M.D., Beaver Falls, Pa., 1912.

Founder.—BAKER, WASHINGTON HOPKINS, M.D., Philadelphia, Pa., 1904.

1889.—BURNS, BERNARD, M.D., Allegheny, Pa., 1892.

1890.—COLES, WALTER, M.D., St. Louis, Mo., 1892.

1889.—DAVIS, WILLIAM ELIAS B., M.D., Birmingham, Ala., 1903.

1892.—DUFF, JOHN MILTON, A.M., M.D., Ph.D., Pittsburg, Pa., 1904.

1898.—DUNN, JAMES C., M.D., Pittsburg, Pa., 1907.

1892.—DUNNING, LEHMAN HERBERT, M.D., Indianapolis, Ind., 1906.

1895.—FERGUSON, ALEXANDER HUGH, M.D., Chicago, Ill., 1911.

1890.—FREDERICK, CARLTON CASSIUS, B.S., M.D., Buffalo, N.Y., 1911.

1891.—GIBBONS, HENRY, JR., A.M., M.D., San Francisco, Cal., 1912.

1904.—GOODFELLOW, GEORGE E., M.D., Los Angeles, Cal., 1910.

1892.—HAGGARD, WILLIAM DAVID, JR., M.D., Nashville, Tenn., 1901.

Founder.—HILL, HAMPTON EUGENE, M.D., Saco, Me., 1894.

1912.—HOTALING, ALBERT STEUBEN, M.D., Syracuse, N. Y., 1913.

1898.—HYDE, JOEL W., M.D., Brooklyn, N. Y., 1907.

1897.—INGRAHAM, HENRY DOWNER, M.D., Buffalo, N. Y., 1904.

Founder.—JARVIS, GEORGE CYPRIAN, M.D., Hartford, Conn., 1900.

1892.—JELKS, JAMES THOMAS, M.D., Hot Springs, Ark., 1902.

1900.—LINVILLE, MONTGOMERY, A.B., M.D., New Castle, Pa., 1910.

Founder.—LOTHROP, THOMAS, M.D., Buffalo, N. Y., 1902.

1891.—MCCANN, JAMES, M.D., Pittsburg, Pa., 1893.

1898.—MCCANN, THOMAS, M.D., Pittsburg, Pa., 1903.

1896.—MOONEY, FLETCHER D., M.D., St. Louis, Mo., 1897.

Founder.—POTTER, WILLIAM WARREN, M.D., Buffalo, N. Y., 1911.

Founder.—PRICE, JOSEPH, M.D., Philadelphia, Pa., 1911.

1896.—RHETT, ROBERT BARNWELL, JR., M.D., Charleston, S. C., 1901.

1889.—ROHE, GEORGE HENRY, M.D., Baltimore, Md., 1899.

1892.—ROSENWASSER, MARCUS, M.D., Cleveland, O., 1910.

1890.—ROSS, JAMES FREDERICK WM., M.D., C.M., L.R.C.P., Toronto, Ontario, Canada, 1911.

1889.—SEYMOUR, WILLIAM WOTKYNS, A.B., M.D., Troy, N. Y., 1904.

1902.—SIMONS, MANNING, M.D., Charleston, S. C., 1911.

Founder.—TOWNSEND, FRANKLIN, A.M., M.D., Albany, N. Y., 1895.

ORDINARY FELLOWS.

Classified.

ALABAMA.

Davis, John D. S.,	2031 Avenue G.,	Birmingham.
Morris, Lewis Coleman,	1203 Empire Bldg.,	Birmingham.
Torrance, Gaston,	325 Woodward Bldg.,	Birmingham.

ARKANSAS.

Runyan, Joseph Phineas,	1514 Schiller Ave.,	Little Rock.

CALIFORNIA.

Buteau, Samuel H.,	1155 Broadway,	Oakland.
Hadden, David,	Oakland Bank of Savings Bldg.,	Oakland.

CANADA.

Howitt, Henry,	221 Woolwich Street,	Guelph, Ontario.
Olmsted, Ingersoll,	215 South James St.,	Hamilton, Ontario.

GEORGIA.

Noble, George Henry,	186 South Pryor Street,	Atlanta.
Westmoreland, W. F.,	241 Equitable Bldg.,	Atlanta.
Whitem, George R.,	2 Liberty E.,	Savannah.

ILLINOIS.

Bacon, Joseph Barnes,		Macomb.
Barrett, Channing,	446 St. James Place,	Chicago.
Goldspohn, Albert,	34 Washington St.,	Chicago.
Lyons, John A.,	4118 State Street,	Chicago.
Murphy, John B.,	400 Reliance Bldg.,	Chicago.

INDIANA.

Walker, Edwin,	712 South Fourth St.,	Evansville.
Porter, Miles F.,	207 West Wayne St.,	Fort Wayne.
Rosenthal, M. I.,	336 West Berry St.,	Fort Wayne.
Van Sweringen, Budd,	208 Washington Blvd.,	Fort Wayne.
Eastman, Thomas B.,	309 Pennway Bldg.,	Indianapolis.
Noble, Thomas B.,	427 Newton Claypool Bldg.,	Indianapolis.
Pantzer, Hugo O.,	224 North Meridian St.,	Indianapolis.
Pfaff, O. G.,	1337 North Pennsylvania St.,	Indianapolis.
Sutcliffe, John A.,	155 East Market St.,	Indianapolis.

IOWA.

Ruth, Charles E.,	407 Equitable Bldg.,	Des Moines.

KENTUCKY.

Frank, Louis,	The Atherton,	Louisville.
McMurtry, Lewis S.,	The Atherton,	Louisville.
Sherrill, Joseph G.,	The Atherton,	Louisville.
Tuley, Henry Enos,	705 South Third St.,	Louisville.
Vance, Ap Morgan,	835 South Fourth Ave.,	Louisville.

MARYLAND.

Branham, Joseph H.,	2200 Eutaw Place,	Baltimore.
Sellman, William A. B.,	5 East Biddle St.,	Baltimore.
Smith, William S.,	528 Hanover St.,	Baltimore.

MICHIGAN.

Abrams, Edward Thomas,		Dollar Bay.
Bell, John Norval,	506 Washington Arcade,	Detroit.
Brown, Geo. Van Amber,	32 Adams Ave., West,	Detroit.
Carstens, J. Henry,	620 Woodward Ave.,	Detroit.
Jenks, Nathan,	271 Woodward Ave.,	Detroit.
Longyear, H. W.,	271 Woodward Ave.,	Detroit.
Manton, Walter P.,	32 Adams Ave., West,	Detroit.
Yates, H. Wellington,	1360 Fort Street,	Detroit.

MISSOURI.

Brown, John Young,	612 Metropolitan Bldg.,	Saint Louis.
Crossen, H. S.,	Metropolitan Bldg.,	Saint Louis.
Dorsett, Walter B.,	Linmar Bldg.,	Saint Louis.
Elbrecht, Oscar H.,	Metropolitan Bldg.,	Saint Louis.
Jonas, Ernst,	465 North Taylor Ave.,	Saint Louis.
Kirchner, Walter C. G.,	Metropolitan Bldg.,	Saint Louis.
Reder, Francis,	6346 Berlin Ave.,	Saint Louis.
Schwarz, Henry,	440 North Newstead Ave.,	Saint Louis.

NEBRASKA.

Findley, Palmer,	418 Brandeis Theater Bldg.,	Omaha.

NEW JERSEY.

Darnall, Wm. Edgar,	1704 Pacific Ave.,	Atlantic City.
Marvel, Emery,	1801 Pacific Ave.,	Atlantic City.
Dickinson, Gordon K.,	280 Montgomery St.,	Jersey City.
Gray, Frank D.,	62 Madison Ave.,	Jersey City.
Ill, Charles L.,	188 Clinton Ave.,	Newark.
Ill, Edward J.,	1002 Broad St.,	Newark.
Hedges, Ellis W.,	703 Watchung Ave.,	Plainfield.

NEW YORK.

Boyd, James P.,	152 Washington Ave.,	Albany.
Vander Veer, Albert,	28 Eagle Street,	Albany.
Vander Veer, Edgar A.,	150 State St.,	Albany.
Chase, Walter B.,	1050 Park Place,	Brooklyn.
Wade, Henry A.,	495 Greene Ave.,	Brooklyn.
Congdon, Chas. E.,	859 Humboldt Parkway,	Buffalo.
Hayd, H. E.,	493 Delaware Ave.,	Buffalo.
King, James E.,	1248 Main St.,	Buffalo.
Lothrop, Earl P.,	153 Delaware Ave.,	Buffalo.
Bainbridge, W. S.,	34 Grammercy Place,	New York.
Bandler, S. W.,	134 West Eighty-seventh St.,	New York.
Davis, Asa B.,	42 East 35th St.,	New York.
Erdmann, John F.,	60 West Fifty-Second St.,	New York.
Furniss, Harry Dawson,	393 West End Ave.,	New York.
Harrar, James A.,	29 East Seventy-seventh St.,	New York.
Hill, I. L.,	616 Madison Ave.,	New York.
Lynch, Jerome Morley,	57 East 52nd St.,	New York.
Lobenstine, R. W.,	155 East Seventieth St.,	New York.
McPherson, Ross A.,	20 West Fiftieth St.,	New York.
Morris, R. T.,	616 Madison Ave.,	New York.
Rongy, Abraham J.,	154 Henry St.,	New York.
Stewart, Douglas H.,	128 West 86th St.,	New York.
Waldo, Ralph,	54 West 71st St.,	New York.
West, James N.,	71 West Forty-ninth St.,	New York.
Moriarta, Douglas C.,	511 Broadway,	Saratoga Springs.
Sadlier, James E.,	295 Mill St.,	Poughkeepsie.
Pearson, William L.,	713 Union Street,	Schenectady.
Poucher, John W.,	339 Mill St.,	Poughkeepsie.
Miller, A. B.,	326 Montgomery St.,	Syracuse.

NORTH CAROLINA.

Lott, Henry Stokes,	123 Cherry St.,	Winston.

OHIO.

Bonifield, Chas. L.,	409 Broadway,	Cincinnati.
Hall, Joseph A.,	628 Elm St.,	Cincinnati.
Hall, Rufus B.,	628 Elm St.,	Cincinnati.
Miller, John D.,	N. E. Cor. Clifton & McMillan,	Cincinnati.
Reed, C. A. L.,	The Groton,	Cincinnati.
Stark, Sigmar,	1108 East McMillan St.,	Cincinnati.
Tate, Magnus A.,	19 West Seventh St.,	Cincinnati.
Wenning, William H.,	5 Garfield Place,	Cincinnati.
Zinke, E. Gustav,	4 West Seventh St.,	Cincinnati.
Crile, George W.,	Osborn Bldg.,	Cleveland.
Humiston, William H.,	536 Rose Bldg.,	Cleveland.
Lincoln, Walter R.,	Lennox Bldg.,	Cleveland.
Scott, N. Stone,	603 Citizens Bldg.,	Cleveland.

Skeel, Arthur,	1834 East 65th St.,	Cleveland.
Skeel, Roland Edward,	314 Osborn Bldg.,	Cleveland.
Baldwin, James F.,	405 East Town St.,	Columbus.
Crotti, André,	1728 East Broad St.,	Columbus.
Goodman, Sylvester J.,	238 State St.,	Columbus.
Hamilton, Chas. S.,	142 South Garfield St.,	Columbus.
Stamm, Martin,	316 Napoleon St.,	Fremont.
Dice, Wm. Gordon,	240 Michigan St.,	Toledo.
Gillette, Wm. J.,	1613 Jefferson St.,	Toledo.
Jacobson, Julius H.,	2050 Franklin St.,	Toledo.
Moots, Chas. W.,	The Nicholas,	Toledo.
Smead, Lewis F.,	242 Michigan St.,	Toledo.
Smith, Chas. N.,	234 Michigan St.,	Toledo.
McClellan, Benjamin B.,	7 East Second St.,	Xenia.

PENNSYLVANIA.

Deaver, John Blair,	1634 Walnut St.,	Philadelphia.
Kennedy, James W.,	1409 Spruce St.,	Philadelphia.
Blume, Frederick,	Jenkins Bldg.,	Pittsburg.
Foster, Curtis S.,	308 Diamond Bank Bldg.,	Pittsburg.
Freeland, James R.,	4715 Fifth Ave.,	Pittsburg.
Huggins, R. R.,	1018 Westinghouse Bldg.,	Pittsburg.
Langfitt, William S.,	Jenkins Bldg.,	Pittsburg.
Sanes, K. I.,	Park Bldg.,	Pittsburg.
Schildecker, Charles B.,	1105 Park Bldg.,	Pittsburg.
Simpson, Frank F.,	Jenkins Bldg.,	Pittsburg.
Smith, Louis Watson,	1624 Station St.,	Pittsburg.
Stillwagen, Charles A.,	524 Pennsylvania Ave.,	Pittsburg.
Swope, Lorenzo W.,	1105 Park Bldg.,	Pittsburg.
Weiss, Edward A.,	714 Jenkins Bldg.,	Pittsburg.
Werder, Xavier O.,	Jenkins Bldg.,	Pittsburg.
Ziegler, Chas. E.,	354 South Highland Ave.,	Pittsburg.

RHODE ISLAND.

Jones, Arthur T.,	81 Elm Grove Ave.,	Providence.
Keefe, John W.,	259 Benefit St.,	Providence.

TENNESSEE.

Haggard, William D.,	148 Eighth Ave., North,	Nashville.

VIRGINIA.

Baughman, Greer,	26 North Laurel St.,	Richmond.
Bosher, Lewis C.,	422 East Franklin St.,	Richmond.

WEST VIRGINIA.

Cannaday, John E.,	Coyle & Richardson Bldg.,	Charleston.

MINUTES OF THE PROCEEDINGS

AT THE

TWENTY-SIXTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

THE RHODE ISLAND MEDICAL LIBRARY BUILDING

PROVIDENCE, R. I.

SEPTEMBER 16, 17, AND 18, 1913

TWENTY-SIXTH ANNUAL MEETING.

SEPTEMBER 16, 17, and 18, 1913.

The following-named Fellows were present:

BOSHER, LEWIS C.,	RICHMOND, VA.
BRANHAM, JOSEPH H.,	BALTIMORE, MD.
BROWN, GEORGE VAN AMBER,	DETROIT, MICH.
CARSTENS, J. HENRY,	DETROIT, MICH.
DARNALL, WM. EDGAR,	ATLANTIC CITY, N. J.
DAVIS, ASA B.,	NEW YORK CITY.
DICKINSON, GORDON K.,	JERSEY CITY, N. J.
ERDMANN, JOHN FREDERICK,	NEW YORK CITY.
FOSTER, CURTIS SMILEY,	PITTSBURG, PA.
FRANK, LOUIS,	LOUISVILLE, KY.
FURNISS, HENRY DAWSON,	NEW YORK CITY.
GRAY, FRANK DELOS,	JERSEY CITY, N. J.
HADDEN, DAVIS,	OAKLAND, CAL.
HARRAR, JAMES AITKEN,	NEW YORK CITY.
HAYD, HERMAN EMIL,	BUFFALO, N. Y.
ILL, CHARLES L.,	NEWARK, N. J.
ILL, EDWARD J.,	NEWARK, N. J.
JACOBSON, JULIUS H.,	TOLEDO, OHIO.
JONES, ARTHUR THOMAS,	PROVIDENCE, R. I.
KEEFE, JOHN WILLIAM,	PROVIDENCE, R. I.
KING, JAMES EDWARD,	BUFFALO, N. Y.
KIRCHNER, WALTER C. G.,	ST. LOUIS, MO.
LONGYEAR, HOWARD WILLIAMS,	DETROIT, MICH.
LOTHROP, EARL P.,	BUFFALO, N. Y.
LOTT, HENRY STOKES,	WINSTON, N. C.
McCLELLAN, BENJAMIN BUSH,	XENIA, OHIO.
McPHERSON, ROSS,	NEW YORK, N. Y.
MARVEL, EMERY,	ATLANTIC CITY, N. J.
MILLER, JOHN D.,	CINCINNATI, OHIO.
MORIARTA, DOUGLAS C.,	SARATOGA SPRINGS, N. Y.
MORRIS, ROBERT TUTTLE,	NEW YORK, N. Y.
NOBLE, THOMAS B.,	INDIANAPOLIS, IND.

PANTZER, HUGO OTTO, ... INDIANAPOLIS, IND.
PORTER, MILES F., ... FORT WAYNE, IND.
POUCHER, JOHN WILSON, ... POUGHKEEPSIE, N. Y.
REDER, FRANCIS, ... ST. LOUIS, MO.
RONGY, ABRAHAM J., ... NEW YORK, N. Y.
ROSENTHAL, MAURICE I., . . . FORT WAYNE, IND.
RUTH, CHARLES EDWARD, . . . DES MOINES, IOWA.
SADLIER, JAMES EDGAR, . . . POUGHKEEPSIE, N. Y.
SANES, K. ISADORE, ... PITTSBURG, PA.
SCHILDECKER, CHARLES BUSHFIELD, PITTSBURG, PA.
SELLMAN, WILLIAM A. B., ... BALTIMORE, MD.
SHERRILL, JOSEPH GARLAND, . LOUISVILLE, KY.
SKEEL, ROLAND EDWARD, . . . CLEVELAND, OHIO.
SMEAD, LEWIS FREDERIC, . . . TOLEDO, OHIO.
SMITH, CHARLES NORTH, . . . TOLEDO, OHIO.
SMITH, WILLIAM S., ... BALTIMORE, MD.
STEWART, DOUGLAS HUNT, . . NEW YORK CITY.
SWOPE, LORENZO W., ... PITTSBURG, PA.
TATE, MAGNUS ALFRED, ... CINCINNATI, OHIO.
TULEY, HENRY ENOS, ... LOUISVILLE, KY.
VAN SWERINGEN, BUDD, ... FORT WAYNE, IND.
WALDO, RALPH, ... NEW YORK CITY.
WEST, JAMES NEPHEW, ... NEW YORK CITY.
YATES, H. WELLINGTON, ... DETROIT, MICH.
ZINKE, ERNST GUSTAV, ... CINCINNATI, OHIO.

Total, 57.

The following-named registered guests were extended the privileges of the floor and invited to participate in the discussions:

Bugbee, Raymond G., ... Providence, R. I.
Bumgarner, Geo. L., ... Pittsburg, Pa.
Cameron, Edward S., ... Providence, R. I.
Carver, R. H., ... Providence, R. I.
Chapman, Wm. Louis, ... Providence, R. I.
Chase, Peter R., ... Providence, R. I.
Chesebro, Edmund D., ... Providence, R. I.
Coughlin, Fred. A. . . . . Providence, R. I.
Day, Frank L., ... Providence, R. I.
De Wolf, Halsey, ... Providence, R. I.
Donovan, T. F., ... Buffalo, N. Y.

Farrell, John T.,	Providence, R. I.
Flanagan, Wm. F.,	Providence, R. I.
Gleason, Wm. F.,	Providence, R. I.
Gormly, C. F.,	Providence, R. I.
Hawkes, Charles W.,	Providence, R. I.
Higgins, Charles W.,	Providence, R. I.
Hoye, Henry J.,	Providence, R. I.
Hussey, F. V.,	Providence, R. I.
Johnson, George F.	Providence, R. I.
Keefe, P. H.,	Providence, R. I.
Magill, Wm. H.,	Providence, R. I.
Matteson, George A.,	Providence, R. I.
McLaughlin, Andrew J.,	Providence, R. I.
Milan, Wm. B.,	Providence, R. I.
Miller, Albert H.,	Providence, R. I.
Nagell, Wm. H.,	Providence, R. I.
Oulton, Lambert,	Providence, R. I.
Partridge, H. G.,	Providence, R. I.
Perkins, Ray,	Providence, R. I.
Richardson, D. L.,	Providence, R. I.
Robinson, Rowland R.,	Wakefield, R. I.
Rothwell, Wm. P.,	Pawtucket, R. I.
Rutherford, J. C.	Providence, R. I.
Shea, R. L.,	Bridgeton, R. I.
Smith, Stafford B.,	New York City.
Sullivan, Walter G.,	Providence, R. I.
Swarts, Gardner T.,	Providence, R. I.
Titus, Philip S.,	Fort Wayne, Ind.
Whitford, Wm.,	Chicago, Ill.

Total, 40.

FIRST DAY—*Tuesday, September* 16, 1913.

Morning Session.—The Association met in the Medical Library Building of the Rhode Island Medical Society at 9:30 A. M., and was called to order by the President, Dr. Miles F. Porter, Fort Wayne, Indiana, who introduced the Honorable Joseph Gainor, Mayor of Providence, who delivered the following

ADDRESS OF WELCOME.

Mr. President and Fellows of the American Association of Obstetricians and Gynecologists: I desire, first of all, to thank you for extending to me the privilege of attending this convention, and I desire also to extend to you in behalf of the City of Providence a most hearty welcome. I know the City of Providence will get great good from your coming to us, and I trust that your better and more intimate knowledge of our city and of our citizens and of our institutions will prove of some interest to you.

I notice that arrangements have been made to show you some of our City, and I observe, for instance, to-day you are going to the Squantum Club, and I venture to suggest that you will find it a most interesting bit of scenery and country. I trust you will carry away pleasant remembrances of your trip.

I desire to thank those gentlemen of your association who were instrumental in getting this convention to meet in our City. I have had the honor of extending a welcome to the City of Providence to many conventions that have met here since my term of office began, but I believe that no body of men can be of more interest or can do greater good to a community than your body can do to us and the City of Providence, because no matter what our walk in life, whether we be rich or poor, we are all interested in the science of medicine and surgery, because we are all interested in battling with the demon Death, against whose agencies medicine and surgery are enlisted to do battle. We are all interested in the advance of medicine and surgery so far, but we look for far greater results. We are all interested in everything that has been discovered, and we realize what great good the discoveries in medicine and surgery have done for mankind. We know what good came from the circulation of blood, from antisepsis and asepsis, from anesthetics, inoculation, and antitoxins. All of these things have been of immense value, of much more value to the human race from the point of view of the layman than anything that has yet been attempted, and we have to give the palm to the surgeons because they can enter the abdominal cavity with as much freedom as a child can go into the interior of a toy. Even the

brain seems to have no terror for the surgeon. We realize that much has yet to be done in the sciences, and we are looking to you as the chosen men of ability and experience; we are looking to you to carry on the progress in these two branches to a much greater extent than it has been carried on so far. For instance, we would like you to discover some cure for the great white plague. Recently, I have read some articles stating that attempts have been made to do away with consumption or tuberculosis. I have wondered why the surgeon could not just go into the human body and take out a lung, repair it, and put it back. It seems to me very probable that we will get the solution of that difficulty from the surgeon. So, gentlemen, it seems to me, your coming to our City means a great deal to us. Your coming is a matter of education, and we look to the results of your meeting with great hope for the human race, not only in this country, but especially in the City of Providence. Therefore it is that I most heartily welcome you to-day in behalf of our City. I trust that your stay here will be extremely pleasant, and that at some time in the future you will visit us again. (Loud applause.)

THE PRESIDENT.—We will ask Dr. Smith to respond to this hearty welcome that has been given us by the Mayor of Providence.

RESPONSE TO THE ADDRESS OF WELCOME BY DR. SMITH.

DR. CHARLES N. SMITH, Toledo, Ohio.—*Mr. President, Mayor Gainor, and Fellows:* It is a pleasure already realized, and a greater one still held in anticipation that we have listened to your eloquent words of welcome. We accept that welcome in the same spirit and cordiality with which it has been extended, and we wish to express to you, to the profession of Providence, to its citizens, our hearty thanks for that welcome.

This Association is a hard-working serious organization, dealing with the serious side of life. To these Association meetings every Fellow brings his best thought and experience, borne of many years of labor, and presents those thoughts to the Association and through the Association to the scientific world, and we trust that so much of value to obstetrics and gynecology and surgery may come from this meeting, that greater reputation may attach to this association; that great benefit may come to mankind, and that some of the glory of the achievements may redound to the credit of the Providence meeting and to the City of Providence.

Again, I thank you in the name of the Association for this welcome. (Applause.)

THE PRESIDENT.—We will now listen to an address of welcome by Dr. John W. Keefe, of Providence.

ADDRESS OF WELCOME BY DR. KEEFE.

Mr. President, Fellows and Guests of the American Association of Obstetricians and Gynecologists: I have two distinct feelings of pleasure in addressing you this morning. In the first place, as a Fellow of the Association it is very gratifying to me to find you all here to-day, because I feel that the meeting of a body of scientists, such as you are, will be of distinct advantage and benefit to the medical profession of this community. Also, it is a pleasure to address you as fortunately I happen to be President of the Rhode Island Medical Society at this time, and I feel from my conversation with members of the Association that they will all be glad to go out of their way to show you any courtesies that it may be possible for them to show you.

We have here several hospitals; the Rhode Island Hospital is one of the hospitals that has 350 beds. We have more than 50 men on the staff, about 16 internes, and this hospital takes care of all types of acute diseases.

We also have a City Hospital that cares for 200 patients with contagious diseases at present; also a pavilion for tuberculosis; also another hospital, St. Joseph's, which has a capacity of 175 beds. That hospital looks out for all types of acute diseases, and it has an annex 10 miles from the City where they treat cases of tuberculosis. We have a State Sanatorium here.

No doubt you have all heard of our famous Brown University, and at one time this famous university boasted of a medical school from 1811 to 1827, during which time they had a medical department in connection with Brown University, and I am very glad to be able to say that the medical school was closed early, and the fact that Harvard was in such close proximity was a distinct advantage. Now, you will note throughout the country the same idea is being promulgated. For instance, cities like Louisville, which had, I understand, some five medical schools, has now concentrated them into one; and so throughout the country the small medical schools are disappearing.

The men who have preceded me in the Rhode Island Medical Society saw the errors of their way early and have set a good example.

Dr. Jones of the Entertainment Committee will be glad to tell you what the committee has done in the way of arrangements to entertain you while you are here.

We very early learned there is something in the way of hospitality in Rhode Island. Roger Williams, who was driven from the Massachusetts bay colony, on account of differing in his religious views

from his friends, when he reached the shore, was hospitably entertained by the Indians, so that our ideas of hospitality have descended from the original settlers in Rhode Island, and we will give you an opportunity this afternoon to determine whether the Indians have taught us correctly.

I trust any man will feel free to call upon the committee or any other physician of the City that he may happen to meet if he wishes to visit any of our hospitals or other institutions. I know they will be glad to help out, so that once more on behalf of the medical profession of the City of Providence, I extend to you a very cordial welcome to our City. (Applause.)

THE PRESIDENT.—I will ask Dr. Sadlier to reply to the address of welcome delivered by Dr. Keefe on behalf of the City, and the medical profession.

RESPONSE BY DR. SADLIER.

DR. JAMES E. SADLIER, Poughkeepsie, New York.—*Mr. President and Fellows:* This cordial greeting and welcome which has been extended to us by Dr. Keefe and the medical profession of New England are very pleasing, and should be an additional incentive to us to make this, the twenty-sixth annual meeting of the American Association of Obstetricians and Gynecologists, one that shall be long remembered for excellence and superiority in its scientific work.

It is somewhat of an innovation for this organization to hold its meetings in the far east, but let us trust that the success of this meeting shall be such that when we depart for our respective homes, we shall feel somewhat perhaps as Kipling might have felt when he wrote these lines:

> "There is neither East, nor West;
> Border, nor breed, nor birth,
> When strong men meet face to face,
> Though they come from the ends of the Earth."

Again, I thank you. (Applause.)

THE PRESIDENT.—I will ask Dr. Jones if he has any announcements to make at this time.

REPORT OF THE CHAIRMAN OF THE COMMITTEE OF ARRANGEMENTS.

DR. ARTHUR T. JONES, Providence.—Regarding entertainments, this noon at 12:30, immediately following this session, automobiles will be in waiting to take the Fellows and guests to the Squantum Club, where some of that Indian hospitality Dr. Keefe has spoken

of will be dispensed to you. After the clam bake, the meeting will be continued at the Squantum Club and the members will return in automobiles in time to get their dinners and return here tonight for the evening session.

To-morrow noon, at the close of the morning session, a buffet luncheon will be served in this building downstairs to the members and guests.

The members of the Ladies Committee at the Narragansett Hotel will see that the ladies are taken in automobiles at quarter of 2 for a ride about the City, and then going to Bristol as the objective point, where a luncheon will be served this afternoon.

To-morrow for the ladies there will be a luncheon at the Country Club, about 5 miles out. They will leave in automobiles from the Narragansett Hotel, but the exact time of their leaving there will be announced later.

The annual banquet, as usual, will be held Wednesday night at the Narragansett Hotel at 7 P. M.

Papers were then read as follows:

1. "The Treatment of Puerperal Streptococcemia with Intravenous Injections of Magnesium Sulphate," by Dr. James A. Harrar, New York City.

This paper was discussed by Drs. McPherson, Davis, Dickinson, Van Sweringen, Skeel, Branham, Yates, Moriarta, Ill, Zinke, and the discussion closed by the author of the paper.

2. "Lactation Atrophy of the Uterus; One Case and Its Successful Treatment," by Dr. Douglas Hunt Stewart, New York City.

Discussed by Drs. McPherson, Hadden, Pantzer, and the discussion closed by the essayist.

3. "Abdominal Cesarean Section; a Study of a Series of Cases," by Dr. Asa B. Davis, New York City.

4. "Cesarean Section For Placenta Previa," by Dr. Ross McPherson, New York City.

5. "The Advantage of Cesarean Section over Other Procedures in Border-line Cases," by Dr. John W. Poucher, Poughkeepsie, New York.

It was moved by Dr. Zinke and seconded, that the discussion on these papers be postponed until after the clam bake at the Squantum Club. Carried.

Afternoon Session, 2 : 30 o'clock.

The President in the Chair.

The papers of Drs. Davis, McPherson and Poucher were discussed

by Drs. Smith, Harrar, Partridge, Zinke, and the discussion closed by the authors of the papers.

6. "Pelvic Joints in Pregnancy and Labor, with Report of a Case with Rupture of the Symphysis Pubis in Labor," by Dr. Henry Enos Tuley, Louisville, Kentucky.

Discussed by Drs. Ill, Davis, and Rongy.

7. "Interesting Conditions Complicating Pregnancy, Labor and the Puerperium, with Report of Three Cases," by Dr. Asa B. Davis, New York City.

Discussed by Drs. Rosenthal, Ruth, Hayd, Dickinson, Pantzer, and in closing by the essayist.

On motion of Dr. Zinke, which was duly seconded, the paper of Dr. Budd Van Sweringen, of Fort Wayne, was postponed until after the reading of the president's address of welcome.

On motion, the Association took a recess until 7:30 P. M.

Evening Session, 7:30 o'clock.

The Association was called to order by the First Vice-president, Dr. Charles N. Smith, of Toledo, who introduced the President, Dr. Miles F. Porter, Fort Wayne, Indiana.

Dr. Porter delivered his address as President.

8. "Conservative Operations for Acute Inflammatory Pelvic Disease," by Dr. Budd Van Sweringen, Fort Wayne, Indiana.

Discussed by Drs. Moriarta, Dickinson, West, Ill, Ruth, and in closing by the essayist.

9. "Significance of Hematuria and Its Management," by Dr. J. Garland Sherrill, Louisville, Kentucky.

10. "Acute Unilateral Hematogenous Infection of the Kidney," by Dr. Curtis S. Foster, Pittsburg, Pa.

11. "The Value of the Renal Catheter in Surgery," by Dr. K. Isadore Sanes, Pittsburg, Pa.

12. "Renal and Ureteral Calculi," by Dr. Henry Dawson Furniss, New York City.

These papers were discussed by Drs. Brown, Furniss, Hadden, and the discussion closed by Drs. Sherrill and Sanes.

13. "Local Anesthesia in Abdominal Surgery with Cinematographic Demonstration," by Dr. Julius H. Jacobson, Toledo, Ohio.

On motion, the Association took a recess until 9:30 A. M. Wednesday.

SECOND DAY—*September* 17, 1913.

Morning Session.—The Association met at 9:30 A. M. and was called to order by the President.

14. "Diagnostic Hysterotomy," by Dr. Gordon K. Dickinson, Jersey City, N. J.

Discussed by Drs. Pantzer, Jacobson, Skeel, Rosenthal, West, Porter, and in closing by the essayist.

15. "The Later Operative Technic in the Treatment of Cancer, with Special Reference to Cancer of the Breast and Uterus," by Dr. Maurice I. Rosenthal, Fort Wayne, Indiana.

16. "Operative Treatment of Mammary Carcinoma, with Special Reference to the Pectoral Muscles and Axillary Space," by Dr. Charles Edward Ruth, Des Moines, Iowa.

These two papers were discussed by Drs. Morris, Frank, Pantzer, Dickinson, Waldo, Carstens, Darnall, and in closing by the essayists.

17. "Laceration of the Cervix; a Causative Factor in Salpingitis," by Dr. Francis Reder, St. Louis, Missouri.

18. "Report of Cases; a Few Unusual Gynecological Conditions," by Dr. Arthur Thomas Jones, Providence, R. I.

19. "The Use of Iodine in Abdominal Surgery," by Dr. Louis Frank, Louisville, Ky.

These three papers were discussed together by Drs. Morris, King, Carstens, Gray, and discussion closed by Drs. Jones and Frank.

On motion, the Association took a recess until 1:30 P. M.

Afternoon Session, 1:30 o'clock.

The President in the Chair.

20. "Cancer of the Uterus and Fibroid Tumors from a Clinical Stand-point," by Dr. Edward Joseph Ill, Newark, N. J.

21. "Observations upon Fibroid Tumors of the Lower Uterine Segment," by Dr. James N. West, New York City.

These two papers were discussed together by Drs. Hayd, Rosenthal, Sanes, Carstens, Frank, Smith, Smead, Kirchner, Noble, and the discussion closed by the authors of the papers.

22. "Observations Based on Seventy Cases of Bowel Obstruction with Special Reference to the Unusual Cases Illustrated," by Dr. Walter C. G. Kirchner, St. Louis, Missouri.

23. "Stenosis of the Pylorus in Infancy with Report of Six Cases," by Dr. John W. Keefe, Providence, R. I.

24. "Fibroma of the Cardia in a Girl of Eighteen; Gastrostomy with Enucleation," by Dr. John F. Erdmann, New York City.

25. "Some Interesting Points of Gall-bladder Surgery, with Report of Cases," by Dr. Joseph W. Branham, Baltimore, Maryland.

These four papers were discussed together by Drs. Smith, Pantzer,

Longyear, Carstens, Skeel, Gray, Noble, and in closing by Drs. Kirchner, Keefe and Branham.

On motion, the Association took a recess until 9:30 A. M. Thursday.

THIRD DAY—*September* 18, 1913.

Morning Session.—The Association met at 9:30 A.M., and was called to order by the President.

THE SECRETARY.—The Executive Council presents the following resolutions:

Resolved, that the division of fees or the paying of commissions, secretly or openly, directly or indirectly, with any person or persons who may be instrumental in influencing patients to apply for operative care or professional advice, is unworthy of any member of the medical profession.

Resolved, that if such division of fees or the paying of commissions is engaged in by any member of the American Association of Obstetricians and Gynecologists, it shall be counted a sufficient ground for expulsion of the member.

Resolved, that the Executive Council considers it its duty to investigate charges against members, made on the basis of division of fees or the giving of commissions, and on receipt of proof of offense, the council shall either permit the resignation of the person or expel him from the Association.

On motion, duly seconded, the resolutions were adopted.

On motion of Dr. J. H. Carstens, duly seconded, the secretary was instructed to have these resolutions printed, and to send a copy thereof to every Fellow of the Association.

26. "A Case of Sudden Severe Hemorrhage Into an Ovarian Cyst," by Dr. William Edgar Darnall, Atlantic City, New Jersey.

This paper was discussed by Drs. Longyear, Pantzer, Noble, Lott, and in closing by the author of the paper.

27. "An Ovarian Cyst which Developed in Nine Days," by Dr. J. H. Carstens, Detroit, Michigan.

28. "Appendicitis in Young Women," by Dr. Henry S. Lott, Winston, N. C.

These papers were discussed by Drs. Carstens, Gray, Ruth, Pantzer, Longyear, Morris, Noble, Yates, and in closing by the essayists.

29. "Omento-colopexy; an Operation Devised for the Correction of Ptosis of the Transverse Colon," by Dr. H. W. Longyear, Detroit, Michigan.

Discussed by Dr. Carstens and in closing by the essayist.

30. "A Review of the Plastic Methods of Closing the Incisional Herniæ." by Dr. Lewis F. Smead, Toledo, Ohio.

This paper was discussed by Drs. Porter, Longyear, Kirchner, Carstens, Morris, Noble, and in closing by the author of the paper.

31. "Notes on Adventitious Tissues of the Abdominal Cavity," by Dr. Robert T. Morris, New York City.

Discussed by Drs. Brown, Marvel, Noble, Kirchner, Zinke, and in closing by the author of the paper.

32. "Cholangitis and Pancreatic Lymphangitis," by Dr. L. W. Swope, Pittsburg, Pa.

Discussed by Drs. Lott and Morris.

33. "A Consideration of Gas-forming Bacterial Infection of the Puerperium," by Dr. Emery Marvel, Atlantic City, N. J.

Discussed by Drs. Tate, Morris and Porter.

Dr. Green, one of the oldest practitioners in Providence being extended the privileges of the floor, reported the case of a soldier on whom he performed a laparotomy 49 years ago for a gunshot wound of the abdomen. The man was shot in the battle of Chancellorsville, Virginia, in the abdominal wall. The bullet entered the abdominal cavity above the ileum through the short rib. The omentum protruded to the extent of two and a half inches. He tried to reduce it, but as fast as it was reduced on one side, it would come out on the other side. He therefore passed a double ligature around it, cut off the extraneous tissue, and closed the wound, and the man recovered.

A year or so later he was again shot on the battlefield, and was operated, and recovered. According to the last report, the man was still living.

He reported this case to contrast the unfavorable conditions in which surgeons worked then as compared with modern conveniences and hospital facilities.

Dr. David Hadden, Oakland, California, showed some colored slides relative to the anatomy of the female pelvis and its bearing on procidentia.

THE FOLLOWING PAPERS WERE READ BY TITLE.

Dr. Henry Schwarz, St. Louis: A Contribution to the Serology of Pregnancy.

Dr. Wm. Seaman Bainbridge, New York: Arterial Ligation, with Lymphatic Block, in the Treatment of Advanced Cancer of the Pelvic Organs. A Report of Fifty-six Cases.

Dr. Raleigh R. Huggins, Pittsburg: The Diagnosis and Treatment of Puerperal Insanity.

Dr. John A. Lyons, Chicago: Acute Intestinal Strangulation Caused by a Freak Abnormally Misplaced Appendix.

INSTALLATION OF OFFICERS.

THE SECRETARY.—We have reached the closing ceremonies. I will ask Dr. Francis Reder and Dr. William S. Smith to escort the newly elected President to the platform.

Dr. Charles N. Smith, in accepting the presidency said: I wish to thank you for the honor you have conferred upon me, and I assure you I do consider it a great honor. To me it is the greatest honor that has come in thirty years of medical and surgical experience, and I doubt whether to me will come any greater honor during my entire life, as indeed I so hold in respect and honor this Association, that I feel but few honors could come from the medical profession greater than that of the presidency of the American Association of Obstetricians and Gynecologists. I thank you, gentlemen. (Applause.)

THE SECRETARY.—It is impossible to induct into office the newly elected Vice-presidents, Dr. Pantzer and Dr. Branham, because they are absent. The only one to hear from is the retiring President, who has become a member of the Executive Council.

DR. PORTER.—I am not able to tell you how much I owe this Association. I feel that if Providence continues to minister unto me in a way I should like, I can show you in a measure something about how deeply I appreciate the honor that you conferred upon me when you made me President of this Association last year, and the best way I can do that will be to continue to do my professional work in the best way that it is possible for me to do it, and especially to continue my efforts in behalf of the progress and continued success of the American Association of Obstetricians and Gynecologists.

I want to thank you for the kindly way in which you have borne with my many shortcomings. (Applause.)

The Secretary offered the following resolutions of thanks and moved their adoption.

Resolved, that we extend our thanks to the City of Providence, and especially to the daily press, for the kindness with which they have treated us, as well as for the excellent report they have given of our proceedings.

Resolved, that the thanks of the Association be extended to Dr. Keefe and to Dr. Jones for the excellent arrangements they have

made and which have contributed so much to the success of this meeting.

Resolved, that the thanks of the Association be extended to the medical profession of Providence, to the citizens, and to the Committee in charge of the Medical Library Building for giving us the privilege of using this commodious hall for holdnig our sessions.

Motion seconded and unanimously carried.

As there was no further business to come before the meeting, on motion of Dr. Porter, the Association then adjourned to meet in Buffalo, New York, subject to the decision of the Executive Council as to time.

E. GUSTAV ZINKE, M.D., *Secretary.*

EXECUTIVE SESSIONS.

Tuesday, September 16, 1913.

The President in the Chair.

THE SECRETARY.—The Executive Council has acted favorably upon the application of the following gentlemen and recommend their election: Greer Baughman, Richmond, Virginia; Frank D. Gray Jersey City, N. J.; David Hadden, Oakland, California; Jerome Morley Lynch, New York City; Abraham J. Rongy, New York City; Lewis Watson Smith, Pittsburg, Pa.; and Edgar Albert Vander Veer, Albany, New York.

THE PRESIDENT.—What is your pleasure regarding these applications?

DR. HERMAN E. HAYD.—I move that they be elected.

Motion seconded and carried.

THE SECRETARY.—At the meeting of the Executive Council, held last evening, your secretary brought up the matter of issuing an index to the transactions for the past twenty-five years in a separate book, and after discussion Dr. Keefe moved that the secretary be requested to look into the matter and notify each member of the Executive Council as to the feasibility of such an index.

This motion was seconded and carried.

THE PRESIDENT.—What is your pleasure in regard to this. Shall the suggestion of the Executive Council be concurred in with reference to the publication of an index?

DR. JOHN W. KEEFE.—I move that the action of the Executive Council be concurred in.

Motion seconded.

DR. GORDON K. DICKINSON.—What will be the expense and can we afford it?

THE PRESIDENT.—That is one of the queries to be made. The secretary is instructed to make a report as to the feasibility of it.

THE SECRETARY.—The index is expected to be issued free of charge to the members. We have the money to do so.

THE PRESIDENT.—The Southern Surgical and Gynecological Association has issued an index, and the Annals of Surgery has issued an index, and such an index would make a valuable volume. The literature, as represented in our transactions, is to a considerable extent rendered valueless by virtue of the fact that the volumes are not at all adequately or well indexed, so that to us an index would be more valuable than it would be to the majority of the societies who have their transactions published as we do.

Motion put and declared carried.

THE SECRETARY.—At the meeting of the Executive Council, Dr. Smith moved that the Treasurer be authorized to pay vouchers of the secretary, including his salary, up to a maximum of $1200 per year.

The reason for this motion is that the secretary is quite frequently put to an expense, and it would be a great inconvenience to consult the treasurer first. The work of the secretary is very complicated and often entails matters of detail, which, to put them on paper completely and make them sufficiently explanatory, would require a great deal of time. Our expenses now amount to that much, but the secretary is not permitted to exceed $500. In the past the Association has always paid its indebtedness of the previous year with the receipts of the coming year. To-day you will find that we are quite ahead and there is no danger of a deficit.

DR. EDWARD J. ILL.—I move that we concur in the action of the Executive Council regarding this matter.

Motion seconded and carried.

The secretary read letters of regret from Dr. Charles W. Moots, Toledo, Ohio; Dr. X. O. Werder, Pittsburg, Pa.; Dr. Lewis S. McMurtry, Louisville, Ky.; Dr. Channing W. Barrett, Chicago, Ill.; Dr. William S. Bainbridge, New York City; and Dr. Rufus B. Hall, Cincinnati, Ohio.

The reports of the secretary and treasurer were presented, and an Auditing Committee consisting of Dr. Hugo O. Pantzer and Dr. Edward J. Ill were appointed to audit the accounts of the secretary and treasurer.

The Chair declared a recess of ten minutes in order to permit the

Auditing Committee to examine the accounts of the secretary and treasurer and report to the Association.

On re-assembling, the Auditing Committee made the following report:

DR. PANTZER.—Your Auditing Committee went at this work with considerable trepidation, and we are very sorry to find a discrepancy of 3 cents; otherwise the documents placed before us for examination were found correct and are approved.

THE PRESIDENT.—With the concurrence of this body we will ask the Auditing Committee to make good the deficit. (Laughter.) Gentlemen, what will you do with this report?

It was moved and seconded that the report be adopted. Carried.

THE PRESIDENT.—The Executive Council has recommended that the next meeting of the Association be held in Buffalo, N. Y. Does the Association concur in that recommendation? If the Chair hears nothing to the contrary, it is taken for granted that the Association concurs in the choice of the Executive Council and recommends that the next place of meeting be Buffalo.

Adjourned.

Wednesday, September 17, 1913.

The President in the Chair.

The Secretary read letters of regret from Dr. Henry Schwarz, St. Louis, Missouri; Dr. Albert Vander Veer, Albany, N. Y.; and Dr. R. W. Lobenstine, New York, regretting their inability to attend the meeting.

The secretary also read a letter from Dr. Frederick Blume, Pittsburg, Pa., tendering his resignation.

THE PRESIDENT.—What will you do with the resignation of Dr. Blume?

DR. J. HENRY CARSTENS.—I move that the resignation of Dr. Blume be accepted, and that he be put on the list as a Senior Fellow for the rest of his life. He has been an active member of the Association all these years.

Motion seconded and carried.

THE PRESIDENT.—What is your pleasure concerning the bereavement of Dr. Werder?

DR. MAGNUS TATE.—I move that a telegram of sympathy be sent to Dr. Werder from this Association.

Motion seconded.

DR. GEORGE N. WEST.—I would amend the motion to the effect

that it be a letter instead of a telegram. You can say much more in a letter than in a telegram and express the feelings of the members of the Association with greater clearness and satisfaction.

The amendment was seconded by Dr. Hayd, accepted and the original motion as amended was put and carried.

THE SECRETARY.—I have here an application for membership. It comes from a Fellow (Dr. Swope) who has been in steady attendance at these meetings. This application might be acted upon favorably now, because the candidate comes so well recommended. The applicant is Dr. James R. Freeland, of Pittsburg. His thesis is accompanied by the annual dues as well as the initiation fees.

THE PRESIDENT.—What will you do with this application?

DR. HAYD.—I move the gentleman be accepted and be elected to fellowship.

Motion seconded and carried.

THE SECRETARY.—I have been importuned repeatedly to induce the Association to hold the meeting of 1915 in San Francisco.

DR. CARSTENS.—"Sufficient unto the day is the evil thereof." The probabilities are the American Medical Association is going to meet there in 1915. We are all members of that body. I do not think it would be wise for the Association to meet there the same year. It is a long distance to travel and involves a good deal of expense. This question can be better determined next year.

DR. DAVID HADDEN.—I wish to extend an invitation to the Association to hold its meeting in California in 1915.

DR. RALPH WALDO.—I move that we accept the invitation to meet in San Francisco during the time that the Fair is in session; the definite date of the meeting to be arranged by the Executive Council.

DR. CHARLES N. SMITH.—I second the motion.

DR. CARSTENS.—I for one do not feel like going to San Francisco for a meeting of this Association. I think there are many other Fellows who feel the same way. This society is too small for the object San Francisco has in view. The American Medical Association will evidently go there and, if it does, and we should decide to meet there, also, we should hold our meeting either a week before or a week after the meeting of the American Medical Association.

DR. ROBERT T. MORRIS.—We could plan to have our meeting follow that of the American Medical Association.

DR. GEORGE N. WEST.—I am in favor of the proposition, but I think it would be wise to lay it over until next year.

DR. JAMES E. SADLIER.—This is a large proposition. We are all

members of the American Medical Association, as Dr. Carstens says and, personally, I do not think it would be wise for the Association to meet in San Francisco.

DR. DOUGLAS C. MORIARTA.—I do not think the meeting of the American Medical Association will distract us, yet I think it would be better to lay this matter over and that we had better not go.

The Chair put the motion of Dr. Waldo and declared it lost.

THE SECRETARY.—The next order is the election of officers for the ensuing year.

The election of officers was proceeded with and resulted as follows: President, Dr. Charles N. Smith, Toledo, Ohio; First Vice-president, Dr. Hugo O. Pantzer, Indianapolis, Indiana; Second Vice-president, Dr. Joseph H. Branham, Baltimore, Maryland; Secretary, Dr. E. Gustav Zinke, Cincinnati, Ohio, re-elected; Treasurer, Dr. Herman E. Hayd, Buffalo, N. Y., re-elected; members of the Executive Council, Dr. Louis Frank, Louisville, Kentucky, and Dr. Miles F. Porter, Fort Wayne, Indiana.

Dr. Robert T. Morris, New York, brought up the matter of division of fees and giving of commissions, and expressed the hope that some action would be taken by the Association in regard to it. He said the ideals of the medical profession are ideals of intellect and of character; that any commercial feature in the practice of a physician means that he loses caste. The American Association of Obstetricians and Gynecologists must be representative of all that is best in the spirit of the times in medicine. It could not afford to accept as a member of the Association any physician who would even thoughtlessly or carelessly lower the standards of the profession.

THE PRESIDENT—What will you do with the communication of Dr. Morris? I think this is a matter of vital importance and I would like to hear from the Fellows as to how they feel about it.

DR. ILL.—I move that this communication be adopted.

Seconded.

THE PRESIDENT.—Would it not be well to put it in the form of a resolution? You can make a rule governing this body that will be applicable from this time on, if you should care to do so. We are not changing the organic law, but making a statement as to what we are going to do in the future. We can declare to-day that we will admit no one who does not sign the declaration read. We can add to that if we like. If we have in our midst any member who has been doing that, the Association should ask him either to quit or get out. With that addition, I would like to see this rule

go into effect immediately, and I should like a declaration to go out as to what we have done.

DR. CARSTENS.—It gives me great pleasure to endorse that sentiment. Some of us have suffered from this very thing, and I would suggest that every Fellow of the Association receive a letter or circular, and stating the resolution that he be requested to sign it for the purpose of placing it on record. I would also offer an amendment that this be not only for future members, but also for those of the present. Every one should be asked to sign the paper.

DR. MARVEL.—That is exactly a part of the provisions of the American College of Surgeons in becoming a member, and it is already established that in becoming a member of that body the Committee on Credentials shall accept no one or recommend any member to the American College of Surgeons who, knowingly or otherwise, divides a fee or takes a benefit in anyway from an instrument maker.

DR. ZINKE.—I wish to say, that I have been informed the officers of the American College of Surgeons contemplate making every member of this body a member of the American College of Surgeons. If that is the case, all will have to sign; if they do not, they will not be admitted.

THE PRESIDENT.—Dr. Zinke is quite correct about that, but it may be there are some of us who will not sign these papers, who will not care to become members of that Association, and consequently we want to go on record the same as the American Surgical Association and the Western Surgical Association.

THE SECRETARY.—Am I to understand, I must send a copy of the resolution to every member with the request that he sign it?

THE PRESIDENT.—It seems better to include a statement to the effect that we will gladly receive the resignation of those who are engaged in this nefarious practice, so that they would be automatically dropped out. It would like to suggest that a motion be made that we put this matter into the hands of a committee and bring it up the first thing to-morrow morning.

DR. CARSTENS.—Let the Executive Council do that.

DR. WALDO.—I would suggest that this communication and the discussion thereon this afternoon be put into the hands of the Executive Council, let the Council put it in shape and bring it before this body for action to-morrow morning.

The amendment of Dr. Carstens was seconded, accepted, and the original motion as amended was put and carried.

THE PRESIDENT.—The Chair is now ready to entertain a motion

to the effect that this sentiment be put into the hands of the Executive Council.

DR. MARVEL.—I move that the sentiment expressed be referred to the Executive Council with recommendations that it be acted upon to-morrow morning. Motion seconded and carried.

The Executive Session then adjourned *sine die*.

E. GUSTAV ZINKE, M.D., *Secretary*.

PAPERS

READ AT THE

TWENTY-SIXTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

THE RHODE ISLAND MEDICAL LIBRARY BUILDING

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SEPTEMBER 16, 17 AND 18, 1913

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PRESIDENT'S ADDRESS.

BY
MILES F. PORTER, M. D.,
Ft. Wayne, Ind.

FELLOWS of the American Association of Obstetricians and Gynecologists.

This is the first meeting of this Association in the state of Rhode Island, and to me it seems that it is especially fitting that we should meet here. Indeed, I wonder that we have not, forced as it were by an irresistible impulse, met here long before this. Because from its birth Rhode Island has been known as the "home of heretics."

Rhode Island is the birthplace of the referendum, the cradle of democracy, and the kindergarten of equal suffrage. Here Roger Williams preached the heresy of voluntary contribution to and attendance upon the church; also the separation of church and state, and, actually, had the audacity to advise the purchase of the land from the rightful owners, the Indians, rather than accept a charter from a king whose title, it was assumed, originated in Divinity.

A heretic is a man whose ideas and opinions are far in advance of the multitude. Master minds are scarce and so, naturally, the "home of heretics" is small—hence "little Rhody." And so I say, it seems a wonder to me that this Association did not gravitate here long before this, because it is the child of heresy. Conceived, born and nursed to vigorous maturity by the splendid heresies of McDowel and Richmond, the Atlees, Dunlap, Tait and Price. With these thoughts in mind, will you permit me to present the theme of this address in the words of another heretic—Kipling?

> When Earth's last picture is painted, and the tubes are twisted and dried,
> When the oldest colours have faded, and the youngest critic has died,
> We shall rest, and faith, we shall need it—lie down for an æon or two,
> Till the Master of All Good Workmen shall put us to work anew.

And those that were good shall be happy; they shall sit in a golden chair;
They shall splash at a ten-league canvas with brushes of comet's hair;
They shall find real saints to draw from—Magdalene, Peter, and Paul;
They shall work for an age at a sitting and never be tired at all!

And only the Master shall praise us, and only the Master shall blame;
And no one shall work for money, and no one shall work for fame,
But each for the joy of the working, and each, in his separate star,
Shall draw the Thing as he sees It for the God of Things as They Are!

By making me the president of this body you conferred upon me at once an honor which I sincerely appreciate, and a responsibility which, though met not without fear and trembling, shall be met none the less squarely and borne to the best of my ability. The past year has been one of as great activity in medicine as any of the past, and the achievements have been equally great though, perhaps, not quite so tangible. I wish, in this address, first to direct your attention to the more important work of the year. Work that concerns the Fellows of this society in their daily efforts of healing the sick and relieving the suffering. Second, I want to say a few things concerning the work of the profession along the lines of the conservation of human life and energy, particularly the part of the work which should engage the Fellows of this Organization. Third, I am going to assert my prerogative and make some suggestions. Inasmuch as my remarks are largely suggestive, I shall make no attempt to give complete and definite references to the literature upon which I have drawn.

THE YEAR'S WORK.

Obstetrics.—Abderhalden's test for pregnancy has been tried in various clinics with varying results. According to Veit, Rosenthal and Markus, the test is positive. Schwarz of St. Louis and Judd of Baltimore also report favorably upon the test. Williams and

Pearce, however, found it unreliable. In a word, it may be said that the reports from continental clinics of Europe are generally to the effect that the test is reliable; while many investigators, in this country and Great Britain, have reported adversely upon it. That the test requires great skill and accuracy is beyond question. Work is being done now, in the Jewish Maternity of New York, by Gutman and Bruskin with a view of simplifying the technic to make the test easier of application.

It should not be forgotten that the reaction remains positive for about two weeks after the termination of pregnancy at term, or after an abortion.

Stroganoff advises the early "getting-up" of patients after confinement, basing his conclusions on 11,000 cases of which 800 were primiparæ. The primiparæ were allowed to get up on the third and the multiparæ on the fifth day. His mortality was 0.08 per cent. from sepsis, and 0.11 per cent. from nonseptic conditions. He had but three cases of thrombophlebitis. Primiparæ are allowed to sit up in bed, and to nurse their babies on the day after delivery.

The use of pituitary extract in obstetrics has received quite a good deal of attention during the past year. The action of the drug seems uncertain and, because of this, 0.2 gram should be the initial dose; although 0.4 gram is, usually, necessary to produce decided results. That the drug has the power of producing powerful uterine contractions, is unquestioned; and its use is, therefore, dangerous before there is full dilatation of dilatability of the cervix. The drug should not be used without complete preparation for operative delivery, in case the danger of uterine rupture calls for it. That the drug sometimes produces an increased flow of milk is true; but, it seems, that this is due entirely to its effect on the muscle fibers, and not to any stimulating effect upon the gland tissue. The best method of administration is intramuscular injection.

It is a lamentable fact that the great majority of women do not receive during pregnancy, labor, and the lying-in period, the attention which, with our present knowledge of obstetrics, could be regarded as efficient or safe. Sound public economy and humanity demand that these patients should have the best treatment and care. The reasons why these patients are neglected may be readily stated: The practice of obstetrics does not pay. Ignorance, due largely to ages of improper teaching, as to the dangers of pregnancy and labor; and a consequent lack of appreciation of the dignity of the accoucheur's calling.

Relief from this deplorable situation lies in the direction of educating the public which in course of time will lead the state to provide free, or at nominal cost, to all pregnant women, who care to avail themselves of the offer, the best attention in well-equipped maternities.

Carcinoma and Sarcoma.—Bossi urges gynecologists to prevent the development of cancer by curing all chronic inflammations and avoiding heroic local applications. His contention is that cancer is solely of histological origin and, in most cases, begins in lesions which are not malignant in character but they degenerate into cancer if neglected or when not treated properly. He says true prophylaxis of uterine cancer consists of early systematic surgical treatment of benign affections of the cervix and of the uterine cavity.

Extensive and complete removal of the internal genitalia for carcinoma of the cervix, is growing in favor with men of the largest experience. Kelly (*Johns Hopkins Bulletin*, Aug., 1913) expresses the hope that further simplification and perfection of the details of this operation will, ultimately, reduce the primary mortality of this operation to that of ordinary laparotomy. It is pretty generally conceded that extensive glandular dissection is not justified.

Pagenstecher hopes to be able to enhance the good effect of the *x*-rays in carcinoma by injecting into the tumor colloidal metals. His theory is that the metal injected will give off secondary rays—each particle acting like a Crooke's tube. It may be possible to send this metal to the cancer cells through the blood, by using metals which have a specific affinity for the cancer cells.

Krönig and Gauss recommend, in the use of the *x*-ray, what is known as the Freiburg method. This method differs from the old in that pure gamma rays are used; these rays are carefully filtered through aluminum 3 mm. thick; they greatly increase the dosage and obtain summation of relatively small, single, deep doses by the cross-fire method, and permit determination of the optimal time limit and precautions against local injury.

These men have used the new method in 146 cases, and report encouraging results. If, after applying radiotherapy in this way to cancers on the surface for one to three weeks, a cure is not accomplished, an operation can be performed at once. The delay caused by trying radiotherapy is, according to these authors, not detrimental.

The reports from Great Britain, Germany, France and this country, on the use of radium and mesothorium are quite in harmony and encouraging. In inoperable carcinoma, recurrent carcinoma, and after incomplete surgical removal of carcinoma, the use of radium

and mesothorium offers hope, because sometimes a cure is obtained and, not infrequently relief from all the symptoms and prolongation of life follows this treatment.

Abbe's paper on the use of radium in carcinoma and sarcoma, read at the recent international Congress at London, (*Lancet*, Aug. 23, 1913) is most comprehensive. It is based on an experience of 750 private cases, covering a period of ten years. Some of the results achieved are really marvelous. Every surgeon should read Abbe's paper.

To summarize, it may be said that radiotherapy, either in the form of *x*-rays, radium, or mesothorium, should be used after all operations for cancer as a prophylactic against recurrence; it should also be employed in all cases of inoperable cancer, because under this treatment some of these cases are rendered operable, sometimes—though rarely—cured, and, as a rule, the symptoms are ameliorated and life prolonged.

In all cases in which it is possible, the growth should be completely removed; if this cannot be done, take away as much as you can, before employing radiotherapy. The rays seem to be more effective when the malignant cells are spread out in a thin layer than when they are piled in large masses.

Jackson's membrane and the various "peritoneal folds," have attracted a good deal of attention during the past year. J. Rilus Eastman and Jackson have written especially valuable papers on the subject. From the knowledge we now have one may, usually, make the diagnosis before operation in cases in which the folds are causing symptoms. Accumulated evidence seems to emphasize the necessity of looking for these "folds" in all laparotomies, and especially when they are found in connection with chronic appendicitis. To accomplish a cure will require, not only the removal of the appendix and the division of the folds, but, in many cases, also the treatment of the coexisting colitis.

The technic of transfusion of blood has been so simplified that we hope to see this very important therapeutic measure used much more frequently than at present. I am especially impressed with the method of Kimpton and Brown of Boston.

The instrument devised by Freund, described in the *Journal of the Michigan State Medical Society*, Sept. 13, 1913, makes the operation of transfusion very easy; it has been used a number of times successfully, and is highly thought of by Vaughn of Ann Arbor. The instrument is, however, more complicated than that of Kimpton and Brown, and it seems there is greater danger from the formation of

coagula with its use, than with the Kimpton and Brown instrument. I feel sure that in the future many lives will be saved by this measure that, heretofore, were lost because of the difficult technic of the operation.

Conservation of Human Life.—The medical profession has never undertaken a more glorious work than the Conservation of Human Life and Energy. For want of a better name, we may call it the "*publicity campaign*" of the medical profession. There is no other work which will begin to compare with it in results, when measured in human life, and the efficiency and happiness of mankind.

The American Medical Association, through its Council on Health and Public Instruction, is doing great work in furnishing the people with facts with which they must be made familiar before the needless waste of human life and energy can be checked. Would it not be well worth while for this Association to do what it can to help along with this work?

The Fellows of this Association are peculiarly fitted to help in this cause. Who knows better than you do the ravages of gonorrhea—the mothers' lives it wrecks or takes—how many it robs of the joy of motherhood—and the children it makes blind? Who, better than you, knows the needs of the pregnant woman and of woman in labor? How infrequently those needs are supplied, and why. Who, better than the busy obstetrician, appreciates the causes of the present frightful and preventable infant mortality?

It is the plain duty of every Fellow of this Association to take an active part in this work along the lines of our especial training and interest.

Whether this work is to be carried on independently or in connection with the American Medical Association, is a matter for consideration. I would like to see a committee appointed at this meeting whose duty it shall be to formulate a plan which will make it possible to begin this important work at an early date.

While we have learned much in recent years, we are still woefully lacking in the causes and treatment of the toxemia of pregnancy. I would like to see a committee appointed by this Association whose duty it shall be to study and investigate this subject in all its phases and report its findings annually. The report of this committee should be presented in the form of a paper, given a place upon the scientific program, and should be open for discussion.

There is another subject which seems most worthy of our attention; it is the function of the thyroid gland and its relation to the sexual apparatus—conception, development of the child, health of the

mother during pregnancy, labor, puerperium, and lactation. I would suggest the appointment of a committee to study this subject. This Committee should also present an annual report in the form of a paper, subject to discussion.

There never was a time when the medical profession stood so high in public esteem as it does to-day. Nor was there ever a time when the profession was more deserving than now. On the other hand, we are censured by the public as never before and, in a measure, justly so. That we, together with all other professions, trades, and callings, should suffer from the epidemic of "money-madness," is but natural and inevitable. But that we should sit supinely, satisfied in our self-righteousness, and quietly watch the spread of this scourge, is to be false to ourselves, false to our profession and false to the people.

We need an ethical revival! And, if we are to preserve our self-respect, we will furnish the revivalists from our own ranks rather than wait until they are thrust upon us by force of public opinion. I need not tell you that I have in mind the matter of "division of fees," "paying of commissions"—call it what you will, it is graft and 'twill stink to Heaven.

I would like to see this Association place itself squarely upon record in this matter by requiring all applicants for membership to pledge themselves not to engage in this nefarious practice, secretly or openly, directly or indirectly, and by expelling members, if such there be, who are guilty of this practice.

Our scientific achievements may be ever so great, our art developed to a degree near perfect, our skill well-nigh marvelous, and yet, if we fail to gain the respect and confidence of the public, the good we accomplish will be of little avail. The really great work of the profession lies not in the direction of curing the sick, but in imparting knowledge that will enable people to keep well. But we cannot get the public to listen to us, much less believe us, unless we have their confidence in our ability and honesty. It has been truly said:

> "No life can be pure in its purpose and
> strong in its strife
> But all life is made purer and stronger
> thereby."

Just as true is it that no life, however "strong in its strife," can accomplish much if it be not "pure in purpose." What is true of the individual is true of a collection of individuals—a community, a

profession. It is of paramount importance then that we do not allow the glitter of gold, the glamour of scientific achievement, or the clouds of pessimistic practicalism to blind out eyes to the fact that a healthy idealism is a great power—perhaps the most powerful weapon we have to wage in the war against disease and death.

As the "mark of rank in nature is capacity for pain," so the mark of rank in the medical profession is the capacity for joy in the work.

THE TREATMENT OF PUERPERAL STREPTOCOCCEMIA WITH INTRAVENOUS INJECTIONS OF MAGNESIUM SULPHATE.

BY

JAMES A. HARRAR, M. D.,

New York.

(With Seven Charts.)

IN a most interesting paper read before this Society in 1910, Dr. R. R. Huggins(1) first proposed the use of magnesium sulphate intravenously in the treatment of puerperal infection. This work of administering magnesium sulphate intravenously was an incident in the study of hyperleukocytosis. It had been suggested to Dr. Huggins by observing the increased lymphocytosis in the spinal fluid after subdural injection of the salt in the treatment of tetanus. No increase of the leukocytosis in sepsis was produced, but the beneficial effect upon the bacteremia was so pronounced that he reported four cases of puerperal streptococcemia in which the intra-venous infusion of magnesium sulphate had brought about an apparent cure. He proved by experiment that in weak solution magnesium sulphatedid not inhibit the growth of the streptococcus *in vitro*, that it did not increase the leukocytes in the blood, and was unable to advance any explanation as to the rational therapeutics of the procedure. He employed a solution of 30 grains of the drug in 8 ounces of normal saline, and verified the work of Meltzer(2) that in weak solution the salt is without danger when used intravenously, if the injection is made very slowly.

Impressed with these results and interested in any means of combating the ravages of severe puerperal infection, Dr. R. W. Lobenstine(3) tested the method at the New York Lying-In Hospital with more or less success. He effected a cure in three cases of streptococcic toxemia of the fulminating type, and in one case of streptococcic bacteremia. This case he reported at the time, and I include it in the present series. His fifth and last case, one of streptococcic toxemia, but with negative blood cultures, resulted fatally, and rather discouraged him in the efficacy of the treatment.

In continuation of this work, I have employed the salt intravenously in nine additional cases of the severer type of puerperal

infection, the bacteria having been demonstrated in the blood of five. The total series of fourteen cases, with complete recovery in twelve, I therefore venture to present briefly with accompanying fever charts as clinical evidence of the value of this adjunct to our present means of dealing with puerperal infection, especially of streptococcic origin. Let it be emphasized that it is quite necessary not to omit any of the approved details in handling these cases, as I am by no means prepared to say that magnesium sulphate is a specific in their treatment. Careful feeding, absolute rest in the open air and sunshine if possible, and strict avoidance of local or operative interference except with the most evident indication therefor, are principles too well established to be neglected. The open-air solarium on the roof of the Lying-In Hospital is especially devoted to receiving cases of puerperal infection. In the chronic cases we have noted invariably marked improvement after transfer to the roof.

It is always more satisfactory, if possible, in advocating a new or unusual treatment for disease to present some theory of the therapeutic action of the drug employed. It must be confessed at the outset that one is at a loss to propose any such theory for this action of magnesium sulphate. That in a 1 or 2 per cent. solution it is not bactericidal *in vitro* was shown by Dr. Huggins. This has been carefully verified by Dr. J. R. Losee of our hospital laboratory. We also have tried to imitate the action in the blood by introducing a weak solution of magnesium sulphate into the blood culture. Cultures of 3 c.c. of blood from Case XIV were added to 100 c.c. neutral glucose boullion together with magnesium sulphate sufficient to make a 2 per cent. solution. No constant difference in a series of tests could be observed between the growth in the flasks to which the salt had been added and that in the control flasks. A number of hemolytic tests then were made to ascertain the action upon human red blood cells. A 2 per cent. solution of magnesium sulphate in freshly distilled water will not hemolyze human red blood cells suspended in normal saline. Sterile water alone added to the suspended red cells results in considerable hemolysis. This was done to prove or disprove the suggestion that by alteration in surface tension and hemolysis of the red cell certain elements already in the human organism might be freed to combine in the attack against the foreign bacteria. However, it is quite plausible that magnesium sulphate may act by stimulating the tissues to the production of opsonin, and thus aid in the destruction of the bacteria.

There also remains the possibility of an agglutination of the

bacteria in the blood by the presence of the salt. Besson(4) in his recent text-book of bacteriology describes certain chemical substances that have the property of agglutinating microorganisms, and goes on to mention weak solutions of commercial formalin, alcohol, chrysoidin, and bichloride of mercury. In the past we have all been witnesses to the attempts at treating puerperal fever by the intravenous injection of these various chemicals in solution. They all proved to be dangerous poisons to the host as well as to the parasite.

It is rather difficult to test the agglutination of streptococci. In culture they grow together and form large granular masses, so that for agglutination tests a homogenous emulsion must be prepared. The serum of patients while suffering from streptococcic infection has no agglutinating capacity for streptococci. The serum from case XIV, after the bacteria had disappeared from her blood, agglutinated streptococci in dilution of 1 to 600 and 1 to 1200. Besson has proved that Marmorek's anti-streptococcic serum has feeble and irregular agglutinating properties. To a given volume of culture at least one-third of that amount of serum must be added. On the other hand, Aronson's serum possesses considerable agglutinating properties for most streptococci. Some cultures are agglutinated in a dilution of 1 to 20,000.

A homogenous emulsion of streptococci was prepared from an agar culture of Case XIV of the series. Equal parts of this emulsion and a saturated solution of magnesium sulphate produced agglutination after one hour's incubation at 37° C., while a control test produced no agglutination. Weak solutions of magnesium sulphate produced no agglutination *in vitro*. That magnesium sulphate in strong solution acts as an agglutinin on various bacteria has been demonstrated recently by Liefman,(5) who has employed it in various strengths in the differentiation of allied strains of bacteria of the colon-typhoid group by the precipitation of their albumins in contrast with serum precipitation. He proved the superiority of the salts of the lighter metals in these experiments, and selected magnesium sulphate as giving the most delicate reactions. He concludes with the statement, "I believe that one need not despair with simple physical means to secure just as characteristic results as are produced with the sera of immune animals."

It is also well known that successive generations of bacteria gradually become immune to simple chemical poisons. This principle might be said to be exemplified in the clinical behavior of these cases of puerperal bacteremia under magnesium sulphate

injections. The drug either cures them in the acute stage or else carries them through into the stage of chronic pyremia where other elements, localization and production of bacteriolysins, or the administration of autogenous vaccines, completes the cure.

Technic of the Injections.—A 2 per cent. solution of chemically pure magnesium sulphate is prepared with freshly distilled water. This is filtered and sterilized in half-liter flasks in an autoclave. This solution will not hemolyze human red blood cells, and I have found by experience that prepared in this way it will not cause any temperature reaction in the patient. Formerly a 1 per cent. solution of magnesium sulphate in physiological salt solution was employed, and a chill or sharp temperature rise frequently followed the injection. A simplified salvarsan apparatus is preferable for the injection but the ordinary infusion set will answer the purpose quite as well. It is important not to cut down upon the vessel, as by direct puncture the same vein can be used a number of times. As many as eight punctures of the same vein have been made on different occasions. The secret in getting into the vein is to make it markedly prominent. This is done by temporarily placing a constricting rubber tube about the upper arm just tightly enough that the faintest pulsation may still be felt in the radial artery. If the constriction about the upper arm is too tight, the arterial as well as the venous circulation will be cut off and the vein will not distend with blood. The needle is inserted in an oblique direction, the spurting of blood from the open end indicating proper entrance into the vein. The rubber tube of the reservoir with the solution flowing in then rapidly slipped over the shoulder of the needle. The reservoir is held at not more than one foot elevation, which will run in 400 c.c. of the solution in about twenty minutes. The injection should be made much slower than the ordinary saline infusion.

The patient experiences a sensation of heat toward the end of the injection, and frequently feels faint, although the pulse usually gains in quality. A small drink of hot whiskey or aromatic spirits of ammonia will steady her. Occasionally the respiration assumes a sighing quality, but no decrease in rate or in depth of the respirations has been observed. It is quite evident that the dangers are not so marked, the drug is not so toxic, when given intravenously, as when employed intraspinously where it is applied directly to the nerve tissue. I have given as much as 400 c.c. of a 2 per cent. solution intravenously simultaneously with 400 c.c. by hypodermoclysis, representing 16 grams or 250 grains of the drug, with no alarming effects. Whereas by intraspinous injection for the production of

anesthesia, or in the treatment of tetanus, Meltzer(6) advises 1 c.c. of a 25 per cent. solution per 20 pounds of body weight, or about 25 grains for a 130-pound individual, as the safe limit. The injections should be repeated every second or third day according to the course of the infection as revealed by the temperature chart.

The method has now been employed in fourteen cases at the Lying-In Hospital. In five of these there was a streptococcic bacteriemia as proved by blood culture. The other nine were all severely infected women with high temperatures and acutely ill with streptococcic toxemia, with pure growth of streptoccoci on uterine culture, but with negative blood cultures.

In forty-six cases of puerperal infection with blood cultures showing streptococci, previous to 1910, but three survived, a mortality of 93 per cent. In the five cases with positive blood cultures since 1910, treated with intravenous injections of magnesium sulphate, all but one have recovered, a reduction in the mortality from 93 to 20 per cent. While this is a small series upon which to base percentages, a perusal of the case reports and of the temperature charts will show that they were desperately ill patients, and of the class heretofore doomed to a fatal issue.

REPORT OF CASES.

CASE I.—Mrs. R. S., a para-ii, twenty-five years of age, was admitted April 30, 1911. She had been delivered with instruments ten days previously. On the second day she had a chill followed by fever and some pain in the lower abdomen. For the succeeding eight days the temperature varied between 102° and 103° F. On admission the temperature was 103.4°, the pulse 112, and the respirations 32. Shortly afterward she had a chill lasting twenty minutes and the temperature rose to 106.8° and the pulse to 140. A blood culture was taken and 30 grains of magnesium sulphate in 8 ounces of sterile water were administered intravenously. The following morning the injection of magnesiun sulphate was repeated. The blood culture taken the day before was sterile, but the uterine and cervical cultures showed a pure growth of streptococci. The next day the temperature fell to normal and remained so two days, then rose to 103°, but in two days more, the sixteenth day postpartum, it again reached normal and she was discharged on the twenty-fourth day. Blood culture on the eighteenth day also showed no growth after forty-eight hours incubation. This case is interesting in that after ten days of infection, the fever gradually growing higher to

reach 106.8° on the tenth day, two injections of magnesium sulphate caused a rapid fall by lysis and brought the case to a satisfactory termination.

CASE II.—Mrs. A. C., a primipara of twenty-six, was admitted December 4, 1910, with a history of having been twenty-four hours in labor. High forceps had been attempted by her private physician. She was delivered of a still born-child with forceps, and given an intrauterine douche. After delivery her temperature was 98° F. and her pulse 90. On the second day her temperature began to go up. An intrauterine culture showed streptococci. The blood culture was negative after seventy-two hours. The temperature was irregular, going to 103.2° F. on the thirteenth day and to 104° F. on the fourteenth day, when a second blood culture still resulted in no growth after forty-eight hours. On the seventeenth day, with the temperature at 101° and the pulse at 90, she was given 30 grains of magnesium sulphate in 8 ounces of water intravenously. In fifteen minutes she had a chill, the temperature going to 104° and the pulse to 130. This was followed by a fall to subnormal. On the twentieth day, with the temperature at 102.3° the injection of magnesium sulphate was repeated. She had a second chill, the temperature going to 105° and falling to 97° in eight hours. The water used in making the solution was not freshly distilled. The temperature then remained normal after the twenty-second day. It is quite probable that the convalescence of this woman was prolonged by repeated intrauterine douchings and iodine applications to the cervix; but the benefit and rapid convalescence after the two intravenous injections of magnesium sulphate are most interesting.

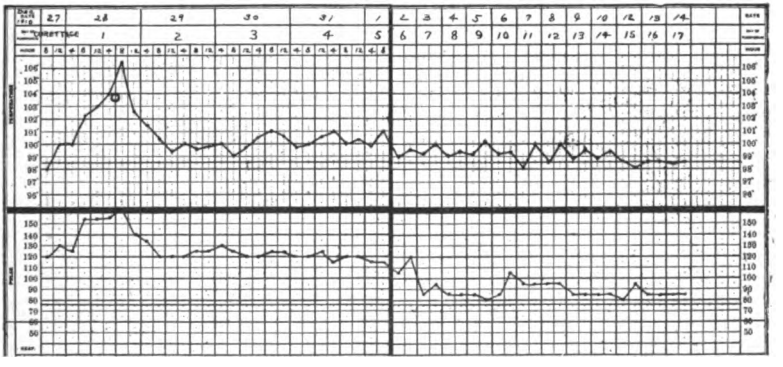
CASE III.—Mrs. P., a primipara eighteen years old, was admitted four days after delivery in her home by a midwife. For two days she had been running a high temperature. Her appearance was one of profound sepsis. The temperature was 101° F., the pulse 120. The uterus was moderately firm and fairly well contracted. Both uterine and blood cultures were taken. The blood showed a leukocyte count of 18,000, with 85 per cent. of polynuclears. A gentle digital exploration of the uterus was made, and a small amount of placental tissue removed.

The uterine culture showed a pure growth of streptococci at the end of twenty-four hours. The blood culture presented no apparent growth after twenty-four hours, but a very abundant growth of streptococci at the end of forty-eight hours.

On the second day after admission, as the patient was evidently growing worse, it was decided to try the use of magnesium sulphate

intravenously. Accordingly 30 grains of the salt were dissolved in 8 ounces of sterile water and introduced into one median basilic vein. There was a slight chill after the infusion and the temperature went up temporarily from 103° to 104.2° F. The pulse continued at about 120 to the minute. On the second day following this first injection, both pulse and temperature showed some slight improvement. The patient's condition also seemed a trifle better. On the third day after the injection the temperature dropped to nearly normal, while the pulse came down to ninety. That night, however, there was a sudden change for the worse; the temperature rose to 105°, and the pulse to 136. Strong stimulation was required and death was looked for within twenty-four hours, the patient becoming weak and listless. A second injection of magnesium sulphate was now given. This was followed by a chill and temperature rise to 106.4° F.

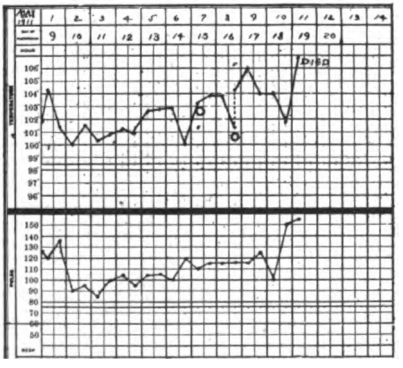
Within six hours the temperature and the pulse began to subside, so that two days later both were normal. A blood culture at this time remained sterile after three days incubation. Convalescence was uneventful thereafter.



CASE IV.

CASE IV.—S. V., a primipara of nineteen, was admitted to the hospital in December, 1910, suffering with an incomplete septic abortion at the third month. She was very anemic from the large quantity of blood she had lost. The red blood corpuscles numbered 1,220,000 and the hemoglobin was reduced to 25 per cent. The white blood cells numbered 30,000, the polynuclears being 88 per cent. The uterus was emptied with the gentle use of the large blunt curet, and the uterus was packed. The following day, the pulse

having risen to 150 and the temperature to 104°, the packing was removed. At 5.30 P. M., she was given 30 grains of magnesium sulphate. Within a half hour, the temperature by rectum had risen to 106°, and the pulse to 160. She was very nervous and excitable. Urination and defecation became incontinent and the patient was rather delirious. The temperature rose to 106.4° in an hour. In two hours it had fallen to 104°, the pulse to 148 and the respiration to 36. By midnight the temperature was 102.6° and the pulse 140, the respirations 28. The patient was very restless the first part of the night with the respirations labored. The latter part of the night she slept at intervals. The next morning she was greatly improved and after the sixth day her temperature became and remained normal. The red blood cells fell to 1,160,000 and the hemoglobin to 20 per cent. The blood picture gradually improved and she was discharged on the seventeenth day.

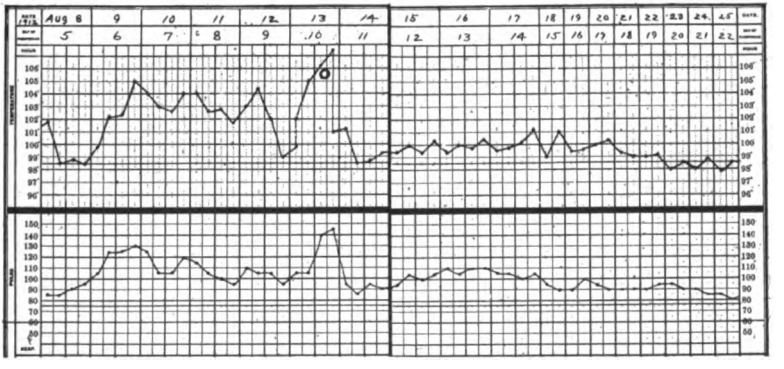


CASE V.

CASE V.—Mrs. S. A. was admitted ten days postpartum in May, 1911. On the fourth day she had had a chill followed by a rise of temperature to 104°, and vomited several times. There was some pain and tenderness in the right inguinal region, which increased until admission. The lochia became foul on the fifth day. There was considerable abdominal distention for three days previous to admission. Blood culture was negative. Uterine cultures showed streptococci in pure growth. There was apparently nothing to be felt on abdominal or vaginal examination. She grew gradually worse until the fifteenth day when 30 grains of magnesium sulphate were instilled into the left median basilic vein. This was repeated on the following day, but without benefit. She died on

the nineteenth day, ten days after admission, of a probable peritonitis. This case is noted to show a case of fatal puerperal infection probably of streptococcic origin, but with negative blood findings. Had the magnesium sulphate been employed earlier and a curettage on the fourteenth day postpartum omitted, the case might have terminated differently.

CASE VI.—Mrs. A. D. This patient ran an irregular type of temperature. On the fifth day there was a severe chill and a rise of temperature to 106° F. The patient had had a manual extraction of the placenta at the time of delivery in the Out-Patient Department service. Cultures showed a streptococcic infection of the uterus. From the third day there was a foul lochia. The patient seemed to be doing well on the tenth day, but on the twelfth day the temperature rose to 104°. On the fifteenth day 11 ounces of a 1 per cent. solution of magnesium sulphate were given under the breast. The temperature went up to 105° F., and showed some improvement. On the seventeenth day the temperature again rose to 103°, and a second injection of 14 ounces of the solution was given under the breast. The patient promptly improved.



CASE VII.

CASE VII.—Mrs. P. O. was delivered by a trained midwife on August 3, 1912. The placenta was said to be intact. The following day the temperature was 103° F. The abdomen became distended, and a private physician gave her an intrauterine douche. He repeated the douche daily for three days when she had a severe chill. She was admitted to the hospital on the fifth day postpartum with a temperature of 102° and a pulse of 90. The abdomen was distended and tympanitic and the lochia was foul. She improved under catharsis and expectant treatment for thirty-six hours, when

the abdomen again became distended, the temperature rose to 102.2° and the pulse to 124. Under ether anesthesia the uterus was explored and a large amount of what seemed to be placental tissue removed with the large blunt curet.

The following day a blood culture was made. This proved sterile after forty-eight hours' incubation. By the tenth day the temperature had reached 105° and the pulse 140. She had become restless and delirious. The abdomen was distended and resistant in the lower portion. The lochia was abundant and with no odor. At 5 P. M. 300 c.c. of a 1 per cent. solution of magnesium sulphate in sterile water was administered intravenously. Within two hours the patient's temperature went to 107.6° F. This is the highest temperature I have ever witnessed in a septic case without fatal issue. She was given a cold pack and stimulated and the temperature rather rapidly fell to 101°. The following day the temperature had fallen to normal and a big change was noted in the patient's general condition. A second blood culture taken at this time also proved sterile after forty-eight hours. After this the convalescence remained uneventful.

The laboratory report on the tissue removed from the uterus showed it to be made up for the most part of muscle tissue which was infiltrated with leukocytes and serum. There were a few areas where there was distinct abscess formation. No placental tissue was present (another argument against curettage in puerperal infection).

CASE VIII.—Mrs. R. McC. was admitted August 24, 1912, with ruptured membranes and an impacted breech presentation. Her temperature was 102° F., and pulse 126. A breech extraction was done and the uterus packed for postpartum hemorrhage. The fever ranged between 101° and 104° for five weeks. There were several rigors followed by a rise to 106° F. A thrombophlebitis of the pelvic veins, with extension to the saphenous of the right leg, occurred. The course of her illness was further complicated with several infarcts of the lung. She received several injections of magnesium sulphate and finally recovered on the sixty-second day. Blood cultures on six different occasions were sterile after forty-eight hours' incubation. In this case it is questionable if the injections were of any benefit. Her recovery was due to prolonged rest in the open air for two months on the hospital roof, abundant nourishment, and an occasional anodyne for pain.

CASE IX.—Mrs. A. F., a primipara of twenty-seven, was admitted in labor, with the fetus presenting by the shoulder, and with

the arm and pulseless cord prolapsed in the vagina. She was delivered by version after some difficulty, and a second degree laceration of the perineum was immediately repaired.

The temperature, which had been 100° F., on admission, rose immediately after delivery to 102.3° and the pulse from 110 to 140. The red blood cells numbered 4,300,000 to the cubic millimeter and the hemoglobin registered 75 per cent. The leukocytes were 33,000, the polynuclears numbering 91 per cent. For the first four days the temperature ranged high, between 103° and 105°. A blood culture taken on the third day showed a pure growth of streptococci in twenty-four hours. She was given 300 c.c. of a 1 per cent. solution of magnesium sulphate in normal saline intravenously at 5 P. M. on the fourth day. At 5.45 she had a severe chill, and became rather irrational. The temperature, which had been 104.3° at 4 P. M. had fallen to 103.3° by 8 P. M., to 101° by midnight, and to 98° at 4 A. M., the lowest since admission. The pulse dropped from 140 to 100. A large decubitus had rapidly formed over the left sacral region, notwithstanding the greatest care.

On the fifth day, she was again given 48 grains of magnesium sulphate in 1 per cent. solution. This was followed by a chill and a rise in temperature to 104.3°.

On the sixth day, the temperature being 103° and the pulse 120, 48 grains of magnesium sulphate were administered intravenously. This was followed by a chill. Eight hours later the temperature was 101°. The patient was irrational and delirious most of the time when not under opiates.

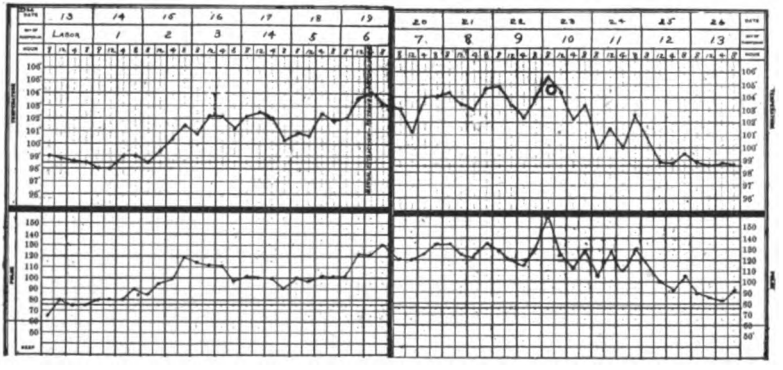
The eighth day a blood culture still gave a pure growth of streptococci after twenty-four hours incubation. The temperature was running between 101° and 99.2°.

The ninth day, with the temperature at 102°, 96 grains of magnesium sulphate were given at 7 P. M. She had a chill at 8 P. M. and her temperature rose to 103° and her pulse to 150. In eight hours she was resting quietly with the temperature at 98.2° and the pulse at 80. Blood examination on the twelfth day showed the red cells to have fallen to 2,760,000. The hemoglobin registered 58 per cent. The leukocytes were 10,400 and the polynuclears 78 per cent.

On the fourteenth day the blood culture was sterile after twenty-four hours but showed a growth of streptococci after forty-eight hours. For the next ten days the temperature ranged between 100° and 102°. Her mentality cleared up, and she was much improved in every way. On the twenty-sixth day a blood culture

remained sterile after twenty-four and after forty-eight hours' incubation. From the twenty-sixth to the thirty-sixth day the temperature was between 99° and 100°. After the thirty-sixth day she ran a practically normal temperature and was discharged cured on the fiftieth day postpartum.

All during her convalescence she complained bitterly of pain in the left sacroiliac joint. This was unrelieved by strapping, or by heat or cold. On vaginal examination there was swelling and tenderness along the line of the joint, but no fluctuation was ever present, nor were there any masses higher up in the pelvis. The anemia rapidly improved under free diet, open-air life on the roof solarium, and small doses of iron citrate. She returned several months later for a secondary repair of her perineum, still complaining of some pain in her left sacroiliac joint.

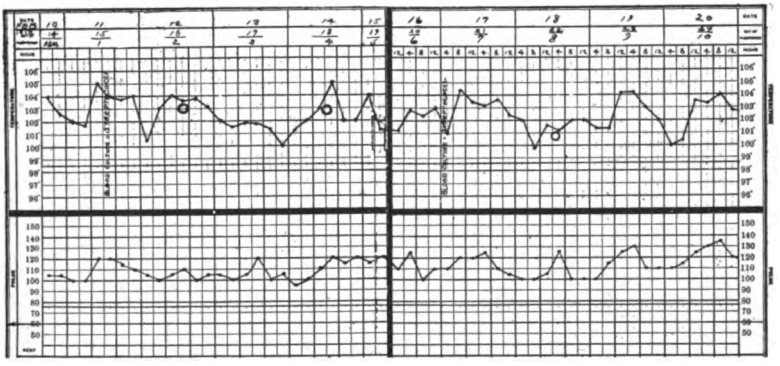


CASE X.

CASE X.—F. C., a primipara of twenty-six, had a normal labor at term, December 13, 1912. On the second day the temperature began to rise and on the following day she had a sharp chill lasting fifteen minutes. The temperature continued high, reaching 104° F. on the sixth day when she had a profuse hemorrhage. Under anesthesia a mass of tissue was removed from the uterus resembling a sloughing fibroid. Microscopic examination showed it to consist of thickened decidua and organized blood clot. The uterus was packed with iodoform gauze which was removed two days later. The temperature continued high, with the pulse ranging between 130 and 140. On the morning of the tenth day the temperature had reached 105.4° and the pulse was running and almost imperceptible. She appeared to be dying. 400 c.c. of a 2 per cent. solution of magnesium sulphate were administered intravenously.

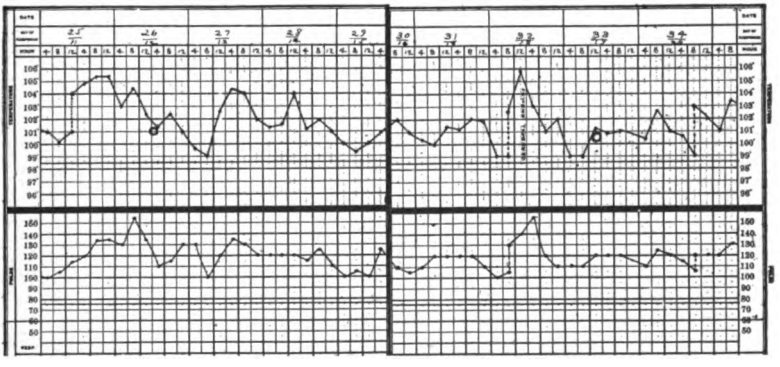
The effect was startling. Within a few hours the pulse had fallen to 120 and was strong, and the temperature had fallen to 102°. Two days later the temperature reached normal and remained there.

CASE XI.—G. C. This woman had been confined fourteen days previous to admission in a miserable place by a midwife. She was



CASE XI. PART 1.

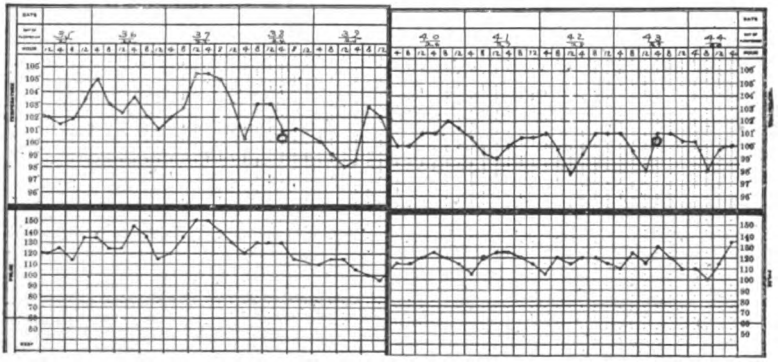
pale, weak, ill nourished and very dirty. The skin was dry and pasty. The tongue was dry and the teeth covered with sordes. The lips dry and scaly and she looked apprehensive and pinched. The temperature was 104°, the pulse 110, and the respirations 28.



CASE XI. PART 2.

There was some tenderness over the uterus, which was 15 cm. above the pubes, but otherwise the abdominal and vaginal examination was negative. A blood culture showed the presence of streptococci in large numbers at the end of twenty-four hours. The next day, 350 c.c. of a 1 per cent. solution of magnesium sulphate in

freshly distilled water was introduced into the vein of the right arm. There was no reaction during or immediately after the injection. The same night 10 c.c. of a stock antistreptococcic serum were given in the muscle of the buttock.



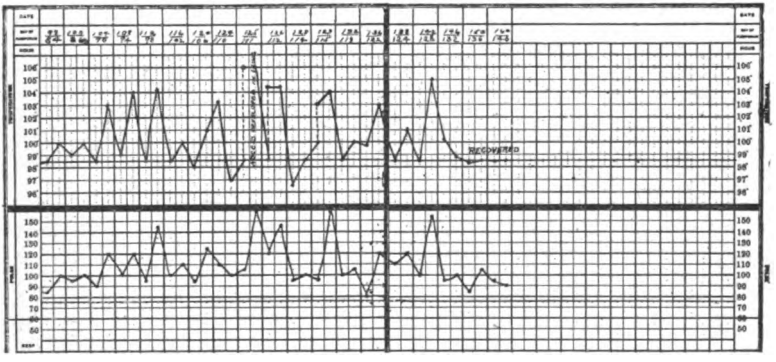
CASE XI. PART 3.

The following day she was much improved and was put out upon the roof of the solarium where she spent the remainder of her convalescence. Two days later 350 c.c. of a 2 per cent. solution of magnesium sulphate in freshly distilled water was given intravenously. She improved for several days when a second blood culture was

CASE XI. PART 4.

sterile after twenty-four hours, but showed a growth of streptococci after forty-eight hours. She seemed distinctly better, however, and the house surgeon made a note, "Nothing to go by save the pulse and temperature." However, that night he had something to "go by." The patient suffered a chill and became unable to

talk. The right side of the face was paralyzed and she became spastic in the left arm and leg. The condition was suggestive of a septic embolus lodged in the pons. The following day she was again given magnesium sulphate. The aphasia cleared up in a couple of days, and on the third day after the paralysis, thirty-three days postpartum, a blood culture was sterile after forty-eight hours' incubation. Two more injections of magnesium sulphate were given at four-day intervals. Then a phlebitis developed in the left leg on the forty-third day. This broke down after a fortnight and a quantity of pus was evacuated by an incision. Blood cultures again showed streptococci, and the magnesium sulphate treatment was resumed on the sixty-four day. Autogenous vaccines were tried for ten days but without benefit. Infarction in the lung was the next complication on the 125th day postpartum,

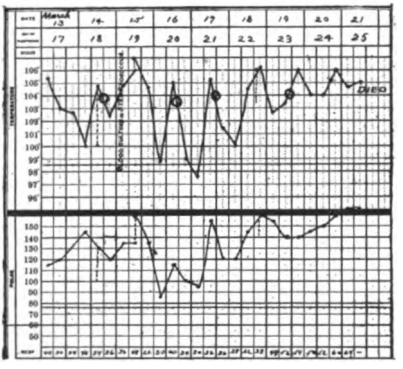


CASE XI. PART 5.

and abscess of the lung supervened, breaking down a week later with the expectoration of a large quantity of pus containing streptococci. After this she rapidly improved and went home cured and rapidly regaining her strength on the 157th day. The paralysis of the leg and arm had practically disappeared. This was one of the severest cases of the series. The infection was a hemolytic streptococcus. She seemed to be progressing splendidly until the chronic pyemia started. The localization of the infection in the various abscesses, however, eventually proved her cure.

CASE XII.—Mrs. R. G. was admitted on the fourth day postpartum with a temperature of 101° F. and a pulse of 120. The fundus was high and tender and the abdomen was distended. A blood culture was taken which proved sterile after forty-eight hours. On the fifth day after admission she had three chills, the temperature

ranging between 104° and 105.4°; 350 c.c. of a 2 per cent. solution of magnesium sulphate were administered at 5 P. M. with the temperature at 105.4° and the pulse at 150. At 8 P. M., the temperature had fallen to 102°, the pulse to 120. By midnight the temperature was 100°, the pulse 110, and at 4 A. M. the temperature was 99°, the pulse 100. She improved after the injection for thirty-six hours when a septic pneumonia developed. The respirations ranged from 36 to 48 until the seventeenth day. On the twelfth day postpartum a second injection of magnesium sulphate was made at 4 P. M. The temperature fell from 103.2° to 99 in eight hours, the respirations from 36 to 28. The temperature ran an irregular course until the twenty-fifth day. She was discharged on the thirty-fifth day postpartum.

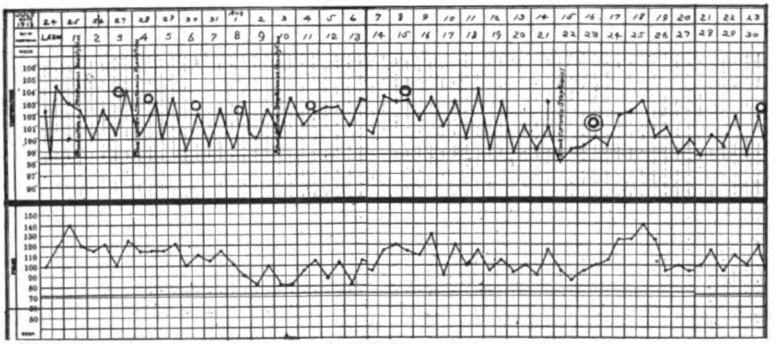


CASE XIII.

CASE XIII.—Mrs. A. R., a primipara, was admitted in desperate condition on the seventeenth day postpartum, suffering with thrombophlebitic bacteremia. She had done very well until the ninth day, when on being lifted out of bed, she fainted and became feverish. She said her right leg was a little painful that day. A few days later the leg became tender, and she began to have chills and fever. She was admitted with a temperature of 105.3°, pulse of 120, and respirations 40. The lungs were congested at the bases posteriorly. The abdomen was distended and tympanitic. There was no rigidity or tenderness. No masses could be palpated. There was marked edema of the right leg and thigh, and redness along the upper course of the internal saphenous vein. Blood culture showed the streptococcus hemolyticus. She was given two injections of magnesium sulphate on the eighteenth and twentieth days, and seemed to be somewhat improved. On the twenty-first day, a pan-

ophthalmitis of the left eye began with pus in the anterior chamber. After this she grew rapidly worse and died on the twenty-fifth day, eight days after admission. This is the one fatality I have to record among the cases of puerperal infection I have treated with magnesium sulphate, but she came to us late, developing no resistance to her infection.

CASE XIV.—Mrs. DeG., a para-ii of twenty-five, was admitted in labor in July, 1913. The membranes were unruptured. She was jaundiced, her tongue was badly coated, and her breath was foul. There were many sonorous and sibilant râles over the chest. The abdomen was distended and slightly tender. The spleen was not palpable. A tentative diagnosis of typhoid was made, which was later refuted by the negative Widal and the course of the illness.



CASE XIV.

The temperature on admission was 102.2°, pulse 100 and respirations 32. In a few hours she was spontaneously delivered of a dead fetus.

The temperature continued high, 104.2° F, and the pulse 140. A blood culture was made that showed a growth of the streptococcus hemolyticus at the end of twenty-four hours. On the third day, she was given 400 c.c. of a 2 per cent. solution of magnesium sulphate in freshly distilled water. This was repeated on the fourth and sixth days. A second blood culture on the fourth day showed a growth of the hemolytic streptococcus. The patient felt much better and wanted to get up. On the seventh, eighth and ninth days she was repeatedly found sitting up in bed against advice. The mental condition was clear from the first. On the eighth day a thrombosis of the right external saphenous developed which was exceedingly painful. She was again given 400 c.c. of magnesium sulphate intravenously. A blood culture on the tenth day still

showed the presence of streptococci. On the eleventh and fifteenth days she received similar intravenous injections of magnesium sulphate, after which the temperature and pulse showed a distinct downward tendency, reaching normal on the twenty-second day. A blood culture taken at this time, however, showed streptococci, and on the twenty-third day she was given 256 grains of magnesium sulphate in a 2 per cent. solution, half into the vein and half under the right breast simultaneously. She showed no ill effects whatsoever from this amount of the salt. A pleurisy now developed near the left apex anteriorly. This caused some secondary temperature reaction. The temperature was practically normal from the thirty-first to the thirty-fourth day, although the blood still contained hemolytic streptococci. She received a final intravenous injection of 400 c.c. of the 2 per cent. solution on the thirty-seventh day. On the fortieth day, a blood culture remained sterile after forty-eight hours, and the remaining convalescence was uneventful.

CONCLUSIONS.

1. In the quantities and dilutions described, magnesium sulphate is absolutely harmless when administered intravenously to women suffering with puerperal infection.

2. Magnesium sulphate is of more value early in the course of the infection than after secondary localization has occurred. In the chronic cases of secondary thrombophlebitis or pyemia it does not appear to be of benefit. Its action seems to be chiefly upon the organisms circulating in the blood.

3. It shortens the course of the bacterial toxemias in which the bacteria cannot be demonstrated in the blood by culture, and anticipates the establishment of a bacteriemia, and finally,

4. It has reduced our mortality in puerperal bacteriemia, especially in streptococcemia, the most fatal form of puerperal infection, from 93 per cent. to 20 per cent.

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DISCUSSION.

DR. ROSS MCPHERSON, New York City.—I have had very little experience with the actual treatment that Dr. Harrar has described except in watching his results. Only one case has come under my observation, which was not a true bacteremia, and that case did very well.

The results, as Dr. Harrar describes them, are nothing short of marvelous as you see these patients improve, and it seems as if we had in magnesium sulphate something which is distinctly worth while to try out pretty generally. The cases of sepsis, without blood culture, are always open to a certain amount of discussion as to whether they would not have done very well under ordinary treatment. The bacteremia cases are very nearly always fatal, and anything which will produce even in five cases, the results Dr. Harrar has given us, is little less than miraculous.

DR. ASA B. DAVIS, New York City.—I wish to confirm what Dr. Harrar has said. In the large number of cases of puerperal sepsis treated in the Lying-in Hospital, there have been comparatively few cases of true bacteremia and yet fewer in whom the blood cultures show streptococci. Dr. Harrar has interested himself in this line of investigation and for this reason we have turned over to his care all such cases, thinking it better to concentrate this treatment in his hands where it can be thoroughly tried out. I have watched with interest and gratification the work which he has done in the cases which have come into my service.

DR. HERMAN E. HAYD, Buffalo.—While I have had no experience with magnesium sulphate, I want to say that such a record as Dr. Harrar has given us ought to stimulate all men in this association to try this treatment, and next year, or at some future meeting, we can relate our experiences in regard to this new form of treatment. It strikes me as being not only very practical but reasonable for us to try in hospitals because there is no expense connected with it. All the vaccines we have been using in these cases are so expensive that it becomes a burden to the institutions to carry on a line of experimentation which we have heretofore been compelled to employ.

DR. GORDON K. DICKINSON, Jersey City.—This paper is more than an obstetric one. It may be of immense value in the bacteremias of the other diseases. I myself am an anaphylactic to the pneumococcus germ, and have wondered whether the doctor in his study of the use of sulphate of magnesium in streptococcemia has not allowed his mind to wander in the other paths, to pneumonia and the infections from other germs. We are all interested in other types of bacteremia, and if he can give us some points on the matter of pneumococcemia and the coccemias of other germs, it might instigate experimentation in different lines.

DR. BUDD VAN SWERINGEN, Fort Wayne.—I was very much interested in the paper of Dr. Harrar and the recital of the case in which a good deal of time elapsed between the beginning of the infection and the close of it. The recovery, as I understand, was

attributed not only to the employment of magnesium sulphate solution, but to the establishment of an abscess in the lung. In the words of Dr. Harrar, this seemed to accomplish the cure.

I have no notes of several instances of streptococcic infection that have come under my observation that are available at this time, but I have had a personal experience that I would like to call attention to that may have some bearing. If it be true that the establishment of an abscess in the lung, as in this one case the Dr. recites, was responsible for the cure brought about, it bears out the contention of a man by the name of Fouchier, who wrote upon the establishment of abscess in these conditions by the injection of turpentine into the tissue of the thigh or back or any available place. I imagine the good results reported by him at that time were due to a biological process, perhaps the establishment of antibodies in this "fixation abscess" as he called it, and whatever the theory may be, a number of cases of my own were treated in that way, as well as others I have knowledge of, and were followed by improvement.

I have had no experience with the injection of magnesium sulphate whatever, but I would like to know whether any of the Fellows have employed this fixation abscess in streptococcic infections, and what experience they have had with it.

Dr. Roland E. Skeel, Cleveland.—I merely want to ask a question and to make a suggestion. I feel that the impressions are worth more than the statistics of the author of this paper, because we can think up any old sort of statistics and prove anything by them that we choose.

It has been very common in recent years for men to make preliminary reports of this kind, and not give us the statistics after the first year, yet this is necessary in order to follow up the use and demonstrate the value of magnesium sulphate in the class of cases described. It is of vast importance to know that twelve or thirteen out of fifteen cases of true streptococcic blood infection, have really responded to this treatment and have recovered after its use. That statement is startling and tremendously vital and it might apply not only to puerperal septicemia, but perhaps to other infections. I would ask the gentlemen who started this work to keep it up, and if it should fall flat, report that flat failure in two or three years from now as methodically as they have reported their preliminary work. This is one of the things in which we fail. We report our wonderful successes, but we do not report our wonderful failures, and I think these observations and investigations should be followed up until it is proven or disproven that sulphate of magnesium does what is claimed for it. In the past we have failed to follow observations of this kind to the end, and I hope that Dr. Harrar will give us a report in three years or even five years from now, since by so doing we will know positively whether there is really anything in it or not.

Dr. Joseph H. Branham, Baltimore.—It seems to me, it would be very much better if the Fellows of this association as a whole would undertake to carry on further experimentation along this line. If this were done, in one year we could demonstrate the value

of magnesium sulphate in these cases of infection, and we would not have to wait four or five years. If all of us had cases of this kind, and we have plenty of them in surgery of one kind or another, and made observations concerning the use of this remedy, we would have reliable data as a guide for this treatment in puerperal sepsis. If we would carry out this method of treatment, in one year this Society could absolutely demonstrate beyond a doubt what there is in this treatment.

DR. H. WELLINGTON YATES, Detroit.—I have been very much interested in this paper, as I was in the paper which Dr. Huggins presented at the Syracuse meeting of this association. I thought there was a general impression at the time that Dr. Huggins in his paper was somewhat biased in his impressions, and that may obtain even now; but we must agree on the laboratory report and with the unbiased writings of Dr. Harrar, that it is becoming more substantial than apparently was the case when Dr. Huggins presented his original paper. Therefore, with the other gentlemen I would suggest that either separately or conjointly as a society we attempt to follow this matter up.

I was impressed with the presentation of the subject, inasmuch as Dr. Harrar apparently regards the toxicity of magnesium sulphate as of very little or no importance. I may be mistaken about this, but in the report of his cases I find that in each instance in which the magnesium sulphate was injected, there followed a distinct chill, with rise in temperature, in most every case, in some to a remarkable degree and, therefore, I think the use of magnesium sulphate is not always so innocent and it should be used with great care. The severity of all these cases inclines me to say this, that as a teaching body of men it behooves us to instruct, as much as possible, the general practitioner who first comes in contact with these cases to have them all in a hospital. Such cases as these cannot under any possible conditions be treated in a private home, and the sooner they are recognized by bacteriological examination and by careful observation the better, and the sooner this treatment is instituted the better.

I was interested again in observing the marked hemolysis in these cases. In one instance the reds were down to 2,000,000 and the increase was very rapid as soon as the magnesium sulphate was used. I do not suppose it was the magnesium sulphate that increased the red blood cells, but nature did that while the magnesium sulphate was doing the rest.

DR. ROLAND E. SKEEL, Cleveland.—Owing to the improvement in the technic of making blood cultures in the last two or three years, may not Dr. Harrar have been able to recognize some cases as being true bacteremia that were not supposed to be such a few years ago because streptococci were not obtained by the methods then employed?

DR. DOUGLAS C. MORIARTA, Saratoga Springs.—It seems an opportune time to emphasize the point made by the other speakers, and the one that I attempted to bring out a year ago in a paper

before the Society; that is, to determine the value of new thoughts and procedures presented to this society, and this can only be done if we follow them up. If this is done, the information will be valuable to the general practitioner, and we will not be obliged to have the present preface to our column of proceedings "The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume."

DR. EDWARD J. ILL, Newark.—May I offer one suggestion with regard to our future experience with this very vital subject. The matter that has been presented to us is as good and vital as anything that has been brought before the association, and I am glad to say that a number of things have been brought before this body and originated in this association during the 25 years of its existence which have continued to live. I want to suggest that anyone who attempts to carry on these experiments should not attempt to make a so-called improvement on the method or suggestion of Dr. Harrar; but wait until his paper is published, study it carefully, and then carry out the method he has given us. Do not let us think we can improve on it. That is where we make a mistake in regard to a new method. I have been disappointed in having improvements made on what I have suggested, and the result has usually been a failure, and the method discredited. Speaking for myself, when Dr. Harrar's paper is published, I shall study it carefully, follow the plan he suggests, and if this is done by all of us in a year or two years we can report, and if he wishes us to make a combined report, he will know exactly what we have learned.

DR. E. GUSTAV ZINKE, Cincinnati.—This subject challenges the interest of every Fellow of the society. I have been much interested in it ever since Dr. Huggins read his first paper on this subject. It is a new method and has, apparently, been practised with success. It is our duty to take it up and see what there is in it. The suggestions made by Dr. Skeel are very timely.

Just a few words in regard to Dr. Moriarta's criticism as to the note "The Association does not hold itself responsible for the views enunciated in the papers and discussions in this volume." I merely wish to state if we withdrew this note we endorse everything that has been said and published in the volume and thus hold ourselves, *eo ipso*, responsible for its contents. The fact is we do not endorse all the views and acts expressed at our meetings. We consider and test what appears to us reasonable and good. We criticise adversely and even reject what appears untenable. If anybody resorts to practices recommended by one or several of our fellows and meets with failure or, perhaps, disastrous results, we render ourselves liable to a certain extent at least. We cannot afford to do this.

DR. HARRAR (closing).—I am more than complimented by the extent of this discussion. We started this work at the Lying-In after Dr. Huggin's paper, and used magnesium sulphate rather as a forlorn hope in these desperate cases. We were surprised and pleased to find in the first few cases that it was of real value. My

colleagues at the hospital have at times scoffed at the method because it is so simple and easy, and because it has been impossible to give an explanation of how or why it acts. All we do know is, it does act in the manner in which I have described in the cases reported, and that it is entirely harmless used in the manner directed. The sharp temperature reactions, which one of the speakers noticed as having occurred after injection, were in cases in which a 1 per cent. solution in normal saline, or in boiled tap water, was employed.

These reactions were not due to the magnesium sulphate. Since using a 2 per cent. solution in *freshly distilled* water we get no reaction. Similarly in salvarsan injections, it has been observed that it is most important to employ freshly distilled water.

As to the occurrence of true bacteremia, we have a large service at the Lying-in Hospital, over 5000 deliveries a year, and we do not get many real bacteremias. For instance, at the time of the forty-six bacteremias which I mentioned, which occurred in the four or five years prior to 1910, 175 cases were diagnosed clinically as bacteremia, and a blood culture asked for, but only forty-six gave positive results. True bacteremia is not so frequent as many believe. I always feel in reports of large series of positive cultures, that there is some contamination in the technic.

As to the use of magnesium sulphate in other infections, I have had no experience except in one case of pneumonia, evidently a pneumococcus infection. With her it was of no value. Infarcts in the lung with small areas of septic pneumonia are rather common in the thrombophlebitic cases. In five of the cases reported we had a septic pneumonia originating from a septic embolus in the lung. It is not necessarily a serious complication.

I do not feel prepared to make any final statement as to the exact value of this method, because I have not yet seen enough cases. We are continually waiting for some midwife or poorly instructed physician to send in a bad septic case in which we can demonstrate bacteria in the blood. We have only had eight since 1910, in five of which I had the opportunity to employ magnesium sulphate.

It is simple to use, and well worthy of trial. Merely make a 2 per cent. solution in freshly distilled water, sterilize it in an autoclave, and run it into the vein very slowly.

DR. HAYD.—How do you distill your water?

DR. HARRAR.—I do not know the make of our still. The bacteriologist attends to that. We buy distilled water, and re-distill it just before using if for injections.

LACTATION ATROPHY OF THE UTERUS.

BY

DOUGLAS H. STEWART, M. D.,

New York.

HISTORY abbreviated from notes taken by Dr. Stafford B. Smith.

Patient, a physician's wife; aged twenty-five. Married in 1906. Health good at that time. First conception July, 1909. Hyperemesis and renal symptoms of severe toxemia set in almost immediately. Patient became so enfeebled that (September) the womb was emptied. Curettage was followed by uneventful recovery. Second conception January, 1910. With careful nursing and assiduous treatment, patient went through pregnancy safely. Male child born October, 1910. Difficult labor, high forceps, no lacerations. Nursed baby three and one-half months. Then discontinued, on account of poor quality of milk. Mother in a highly nervous state due to husband's departure for Europe.

Normal menstruation (March) five months after parturition. Milk never left breasts so far as is known after this.

Third pregnancy July, 1911. Severe toxemia, prostration and fainting spells. Curetted in August, 1911. Usual flow for two weeks; then gushes of blood nearly every day. Patient complained of a lump in her side, which varied in size and could be felt through abdominal wall. This was verified, a suspicion of extrauterine pregnancy negatived, and the uterus tamponed, all under anesthesia in October, 1911. Good recovery and normal menstruation followed in October, November and December, but in January, 1912, there was only a slight, brownish, bloody stain on a single napkin. After that nothing. Patient complains of dull, dragging ache in left pelvis. She became bloated, discontented and melancholic. During the summer of 1912 she showed all the usual symptoms of the menopause, including a gain in weight of 25 pounds, mostly soft fat. Lying in bed upon her right side would relieve the pain, and standing, sitting upright or lying upon the left side, would intensify it. All treatment proved futile so far as relief was concerned.

January, 1913. Patient came to the conclusion that she could not "Stay in bed forever and standing up was impossible, therefore, the lump must be removed."

February 20. Laparotomy. (Described elsewhere.)

February 23. Normal menstruation lasted three days. February 26, usual brown, pink, fourth day, discharge. Breasts empty for the first time in two years. Unwell monthly ever since. So much for the history.

Treatment, galvanism, faradism, intrauterine stems, and all the expedients that three or four physicians could suggest are not mentioned in detail because, as Dr. Smith stated in the history, "treatment of all sorts failed."

Uterine atrophy is the rule in the third or fifth month of lactation, after which time the uterus should enlarge and the menstrual flow should reappear. If this does not so occur, in fairly regular sequence, then the walls of the uterus atrophy, or rather, remain atrophied and the cervix and fundus take part in the atrophy a few months or years later.

The uterine canal in this case was 4 inches in depth, quite a different thing from nondevelopment or infantilism and from senile changes. Repeated examinations revealed a left lateroflexion, traceable from the fundus to the cervix which were often on the same level. The fundus would slide away from the examining finger, presenting the deceptive sensation to the feel of a nonuterine or separate mass. The fundus and cervix were hard, but the thin, stretched body between them could not be made out unless the patient was under deep anesthesia. Traction or pressure upon the cervix did not noticeably move the fundus. The fundus could be placed in any position but always flopped back to the left lateral one.

The passage of the sound necessitated bending it into a large hook, but ill adapted to the vagina, yet it could be passed. Prolapse was not a factor, the flexion was due to lack of sufficient mural rigidity to hold the uterus upright, and when the uterus bent over the ovary prolapsed. Dr. Clement C. Young, who assisted me at the operation, summed up the condition of affairs by stating "This is about as normal a pelvis as I ever saw opened."

Silk was used. The ovary was fastened on its shelf. The uterus was suspended by the round ligaments. The ligature was doubled to prevent cutting, passed through the abdominal wall, and tied outside of the aponeurosis. The points of contact between the round ligament and the parietal peritoneum were touched with tincture of iodine. The abdomen was closed in the usual manner and the results are satisfactory to all parties concerned.

Two months after operation the patient came to me with a very

severe pain "way down inside." Examination revealed every structure in good position. Rectal and vaginal palpation showed the inside of tuberosity of ischium (left) to be very sensitive indeed, yet pressure on the bone through perineum did not reveal any tenderness. It was a very confusing thing and only after long study it dawned on me that it must be a neuritis, that it must be gouty (or rheumatic), and that the internal pudic nerve was the offender. Gout is a protean disease, but I am not aware that attacks in this particular region have been described. Charcot found gout occurring on the paralyzed sides of hemiplegics, who, before being paralyzed, were free from gout, and he considered diminished circulation the factor. One would naturally suppose that a lateral horseshoe flexure of the uterus would spoil the venous drainage of that side of the pelvis, determine where the outbreak would occur, and shift it from its usual articular site. Diet and colchicum acted, as anticipated, and the patient is now in splendid condition.

August 29. Patient reports "good health, camping out and roughing it."

I wish to deny that nursing and curettage are necessary and essential factors. They may or may not be. If the essential cause is ever found, I think it will be discovered in the deficiency of some substance which, when present, causes the usual growth of the uterus, after the usual atrophy which follows the establishment of lactation.

Since writing the above I have studied the following cases:

No. 2. I reported to the *Med. Record* some years ago as giving milk eight years after the birth of her only child. I reexamined her August 5, 1913. Uterine atrophy marked. Tallow-candle shaped uterus. Anteversion: Depth 3 1/2 inches. Nursed child seven months. Curetted once two years after labor. Normal adnexa.

Nos. 3, 4 and 5. Cases consulting Dr. C. C. Young at Bellevue, O. P. D. All one-child sterility. Atrophy well marked. All nursed the child less than one year. No curettage. Lactation. Normal tubes.

No. 6. Case from Newark, N. J. Deep cervical laceration. No curettage. Nursed child four months. Lactation free. One child three years and six months old. Uterine atrophy. Thick tubes.

No. 7. On August 29, I found this woman in Dr. Young's clinic. She was nursing her first child, now eight months old, and she was wondering why her "unwell did not come on." If it ever does reappear I shall be astounded. The uterus is long but barely as large around as one's forefinger. It was hardly creditable that it

ever had or could have conceived and borne a child. But it had. No curettage. Anteversion. Normal adnexa.

Theoretically, I am led to think that with lactation atrophy the breasts either produce too much "mammary extract" and the uterus wastes away as a fibroid sometimes will when powdered cows udder is administered; or the secretion drains off, in the milk, some hormone which should stimulate the circulation, nutrition and growth of the uterus after the normal or physiological atrophy of the fifth month of lactation and the physiological process becomes pathological, in time.

In Case No. 1, I made the circulation right. After that lactation ceased and growth and menstruation started at once.

DISCUSSION.

DR. ROSS MCPHERSON, New York City.—Mr. President: I had the pleasure of seeing this case in consultation with Dr. Stewart, and at the time I examined her, which was after Dr. Stewart and treated her for some time, the impression I got from the examination was that the patient had a prolapsed ovary or an inflamed tube with consequent obstruction to circulation, and that was all. The flexion described, at the time I saw her had evidently been corrected, and I recommended that the abdomen be opened, the condition of the adnexa investigated, and treated as seemed best at the time of the operation. As Dr. Stewart has stated, when the abdomen was opened, the pelvic cavity and its contents were nearly normal, as much so as one could desire, with the exception of the prolapsed left ovary. That, as he has told you, was put back into place, and the patient immediately recovered from her trouble. I have wondered since whether the secretion which was present in her breast was not the secretion that we find in many cases of pelvic disturbance, the disturbance being relieved, and the secretion disappearing. I have wondered whether it was not that rather than that the milk had remained for a considerable period of time since the birth of the last child.

The condition is an interesting one, and I think rather unusual. I had not before seen a case of lactation atrophy or one that presented such symptoms. I was glad to see the case, and I hope someone else has seen patients of the same sort.

DR. DAVID HADDEN, Oakland, California.—I think it might be interesting in this connection to report a case I operated on about two years ago. There was no lactation connected with the menstruation. The woman had a baby four years before the time I saw her and had not menstruated. The uterus was retroverted, and both ovaries were prolapsed. There was a deep laceration of the cervix and an ulcer. We corrected these conditions, and two

months after operation she began to menstruate and has since menstruated every month, with practically a normal flow.

DR. HUGO O. PANTZER, Indianapolis.—The paucity of the literature on this subject first came to my recognition some twenty-five years ago. I had confined a frail blonde, who had conceived only after being married upward of a year, and had carried her child to full term. The delivery was by forceps, owing to uterine inertia. There were no complications in childbed. The child was nursed at the breast for two years and thrived wonderfully, in contrast with the mother, who waned in health. Three years after childbirth, the woman had neither menstruated nor conceived again. The desire for more offspring brought her to me. I found a small, atrophic uterus. General roborant remedies, ergot, iron and aloin, and an intrauterine stem worn for several months, reestablished menstruation, and patient conceived again some time later. It seems fair to here associate etiologically the atrophy of the uterus and the amenorrhea with the excessive lactation.

DR. STEWART (closing).—Dr. McPherson did see the patient as he says. He did more, he removed a Ferguson intrauterine supporter from the uterus at the time of operation, saving me the necessity of introducing my hand into the vagina. But the removal of the Ferguson left the womb in the position of anteversion which was quite different from its usual place.

Atrophy of the uterus presents these paradoxes. It may be puerperal or nonpuerperal; may follow total removal of virgin breasts or too long lactation. It may or may not depend on some alliance with thyroid activity and it may or may not follow birth traumatisms. Lactation-atrophy appears to be a continuance of involution, hence its old name of superinvolution, caused by prolonged lactation even though the period of actual suckling may be short. The atrophy is mural (not at first general or symmetrical) and the depth of the uterine canal is increased; producing a sausage-shaped uterus.

The question "Are pelvic or breast conditions most at fault?" might be answered quite differently with different patients or even with the same patient at different times. Prolonged lactation has a decided tendency to initiate certain evil effects but no amount of pelvic injury can initiate lactation; the injury can disturb after initiation; that is all.

Any injury or condition which disturbs the circulation of blood through the uterus may prolong lactation and thus form a vicious circle, which may be broken most readily by attacking the pelvis first. But in one of my cases the pelvis is in good condition and I would be at a loss to know just what to attack, even though in accord with the opinions expressed that bad pelvic conditions should be remedied as quickly as possible, when existent.

CESAREAN SECTION. A STUDY OF A CONSECUTIVE SERIES OF CASES.

BY

ASA B. DAVIS, M. D.,

New York City.

(With Three Illustrations.)

IN response to a request to present another paper on Cesarean section, I desire to present herewith forty-six cases, which represent our experience with this operation during the past year, from October 13, 1912, to September 13, 1913, and also for completeness, the 147 cases presented at the last annual meeting of this Association in Toledo, making in all 193 consecutive cases of Cesarean section performed by the writer since January, 1901. Some of the results of these operations are as follows:

One hundred and seventy-four, or 90.2 per cent. of these mothers, recovered and were discharged in good condition except five cases now convalescing in the Hospital. Nineteen or 9.8 per cent. of the mothers died. In the first 100 operations, there were fifteen maternal deaths. In the succeeding ninety-three operations, there were four maternal deaths, three of these were from sepsis. Two of the patients had been long in labor under the care of midwives before admission. The other septic case was wholly under our care. The fourth death was due to eclampsia with constant coma and death in twenty-five hours. Twelve of these nineteen deaths were due to some form of sepsis and nine of them acquired their fatal infection and had been under the care of midwives and doctors prior to admission to the hospital. One of the three remaining deaths due to sepsis was in a woman who made the usual good recovery and had been up and walking about for three days. On the twelfth day postpartum, there was a discharge of pus from the vagina which proved to be swarming with colon bacilli. There was no rise of temperature or other unfavorable symptoms. The vaginal discharge ceased and on the fifteenth day of her puerperium she was discharged from the hospital in apparently good condition. Two weeks later she was readmitted suffering from an abscess in the anterior abdominal wall, midway between the umbilicus amd sym-

physis. This abscess was found to connect with a necrotic uterus. Hysterectomy was done and she died ten days later. The second patient of this group of three was of low-grade intelligence and not physically robust. She was so filthy in her habits that it was next to impossible to keep her fingers free from feces and lochia. She died on the fifty-fourth day postpartum, from a slowly progressing septic endometritis. The twelfth death from sepsis was in a patient wholly under our care. She had a long and exhausting dry labor which lowered her resistance. No examinations were made except with sterile gloves. Manual dilatation was done and high forceps attempted but failed and it was unquestionably proved that this was not a border-line case but one positively requiring Cesarean section because of a high promontory and contracted inlet. This operation was then done at an unfavorable time and the patient died of sepsis on the eighth day, acute dilatation of the stomach being a contributing cause. Had this Cesarean section been performed at the onset, or shortly before labor began, she would in all probability have lived.

Four mothers died from eclampsia. Three of these suffered from constant coma and anuria and all died within the first twenty-six hours. The fourth eclampsia patient died on the first day postpartum.

One maternal death was due to pneumonia. This patient was not quite at term, almost moribund, sitting nearly upright in bed owing to great distress in breathing, and lifting the heavy abdomen with each inspiration. She was entitled to relief, and also in the interest of the child it was decided to do an antemortem, rather than a postmortem, delivery. Without moving the patient, Cesarean section was quickly done and there was great relief and improvement for twelve hours, then a failing heart which would not respond to stimulation complicated the situation and the patient died two hours later. The child lived for five days.

One patient died from acute dilatation of the stomach thirty minutes after the completion of the operation. One from shock, atonic uterus, obstinate and slow hemorrhage, after her third Cesarean operation. She was small and frail and died under conditions which a more robust patient would have withstood.

In the above series of cases 196 infants were delivered, twins in three cases. One hundred and sixty-five or 84.1 per cent. survived and were discharged in good condition, except four who are still in the hospital thriving and awaiting discharge in a few days. Thirty-one or 16.9 per cent. of the children were stillborn or failed

to live. Eleven or 35.4 per cent. of this infant mortality were stillborn, including one nonviable fetus delivered by Cesarean section from a mother suffering great distress from general anasarca, tense abdominal distention and a pelvis and abdominal viscera filled with sarcoma. A considerable percentage of the remaining infant mortality was caused by premature births due to some condition in the mother which made prompt delivery imperative, such as placenta previa with hemorrhage, eclampsia (in which case the fetus not infrequently shares the mother's intoxication), or to injuries from attempts at vaginal delivery or from the compression of long labor or tonically contracted uterus. In some instances healthy robust appearing infants at the time of delivery have died within a few days from the bacteriologically proven systemic infection which was the cause of death in the mother.

INDICATIONS WHICH CALL FOR ABDOMINAL CESAREAN SECTION.

We believe that painstaking systematic pelvimetry is all important as a guide in every case of pregnancy. It covers only a part of the question, however, and not infrequently we meet cases in whom the disproportion between the pelvis and the fetus is so evident, or cases in whom craniotomy or high forceps have occurred, resulting in stillbirth or the delivery of children who have lived but a few days, that even though the pelvic measurements conform to those which are considered normal and ample, we are justified in disregarding them and delivering the child by Cesarean section.

We find that contracted pelvis in some form has been the main indication for this operation in 81 per cent. of our cases, including generally contracted pelvis, flat, oblique, funnel shape or male type, rachitic, kyphotic, double promontory, exostosis from the symphyseal or the sacroiliac joints, or a moderately contracted pelvis which is tilted backward in such a way that the relation of its axis is changed and the horizontal plane of its symphysis is abnormally below that of the promontory.

Marked disproportion between the capacity of the pelvis and the size and moldability of the fetal head may call for Cesarean section. We must estimate, not only the size of the head (or breech) but the hardness of the cranial bones and the width of the sutures and fontanelles.

Unduly large children may be the sole indication for this operation. This holds true especially in elderly primiparæ in whom the prospect of subsequent pregnancy is remote. Two such cases are found in our list.

Accidental Hemorrhage.—We have performed Cesarean section twice with this as an indication; once in a primipara with a dead fetus at about eight months, dangerous hemorrhage and undilated cervix. The mother recovered. It was also done once in a multipara in whom we had amputated a lacerated cervix which was almost in shreds, repaired the anterior and posterior wall of the vagina, suspended the uterus and operated by the Mayo method for umbilical hernia with excellent results several months prior to the last pregnancy. She was beaten by her neighbors; had a large hemor-

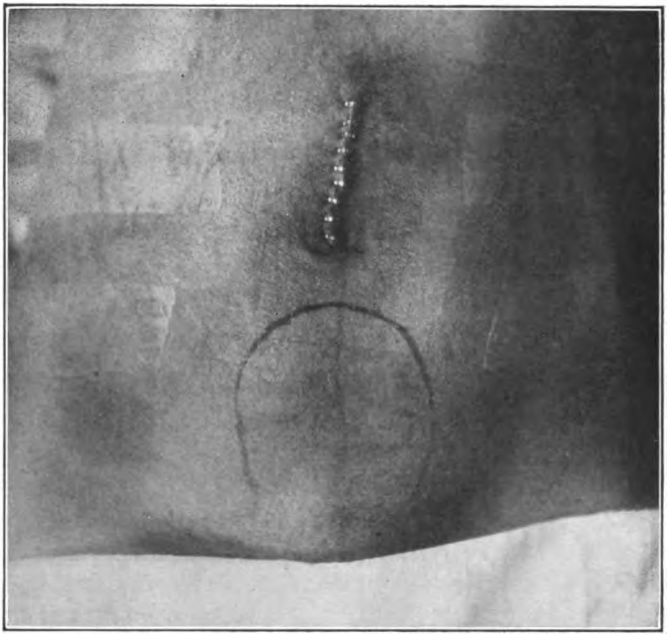

FIG. 1.—Cesarean section patient four days after operation, showing relative position of operative wound and uterine fundus.

rhage from the uterus; was bleeding moderately when admitted, but not in labor. After observation for two days, quiet in bed, active hemorrhage began, fetus alive, no dilatation, Cesarean section, premature child lived seven hours. The mother made a good recovery.

Impacted Face.—We have delivered four women by Cesarean section in whom this condition was present, with a contracted pelvis in each case. Four of the mothers and three children recovered.

After Ventral Suspension.—This has been the indication in nine of our cases. In nearly all of these this was the chief indication, coupled with long, unsuccessful labor. Contracted pelvis with a history of previous operative delivery, etc., were complications in some.

Tonic Uterine Contraction.—This has been the main indication in four cases. There was in each case, however, an actually contracted pelvis, or a disproportion between the pelvis and the child,

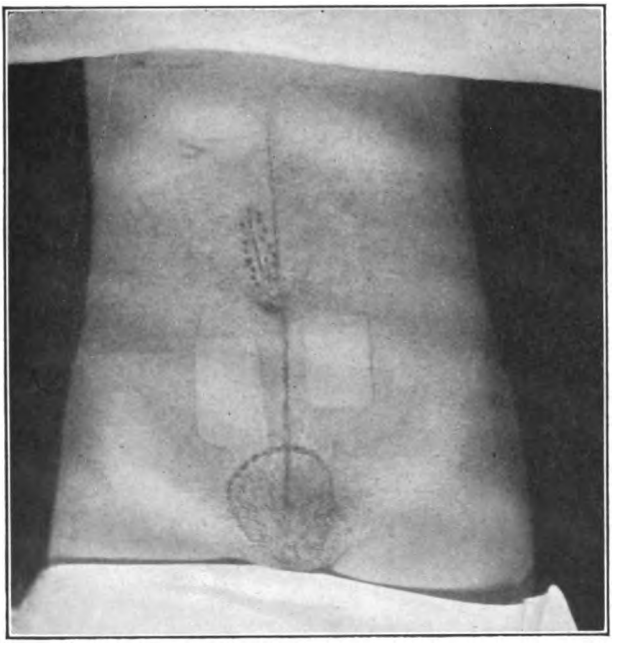

FIG. 2.—Cesarean section patient ten days after operation, showing relative position of abdominal wound and uterine fundus.

long, dry labor, and undilated cervix. Three mothers recovered. Two children were dead before operation. The other two died in a few days after delivery.

Placenta Previa.—This was present in five cases, but was the sole indication in only two. Both of these mothers and children made good recovery. Central placenta previa was unexpectedly found in a woman who was in very active premature labor when admitted and had been for many hours. Her cervix had been amputated; the internal os was not dilated; there was no hemor-

rhage. The interposition operation had been performed on her uterus and the perineum had been extensively repaired. Her child lived but a few hours. The other two cases had marginal placenta previa, and moderate bleeding, and also contracted pelvis which were the main indications for Cesarean section. We are in favor of employing this operation more in certain cases of placenta previa, especially in primiparous women in whom there is active hemorrhage, an undilated cervix and a viable child.

FIG. 3.—Mother and family, all delivered by successive Cesarean sections. Another child not shown here died at ten months of summer diarrhea. A total of six Cesarean operations on the same patient.

Eclampsia.—We have delivered fifteen eclamptic women by Cesarean section. All were either having convulsions or in coma. Twelve were primiparæ. None were in labor, nearly all were not at term. Eleven, or 73.3 per cent. of the mothers recovered. Four, or 26.7 per cent. of the mothers died. Three of these had anuria, never regained consciousness and died within the first twenty-six hours after operation. The fourth died on the first day postpartum. Five children were delivered from the four mothers who died. Four of these children lived. Seventeen children were delivered from the fifteen eclamptic mothers, twins twice. Eleven or 64.7 per cent. of these seventeen children lived and were discharged in good

condition. Six or 35.3 per cent. of these children were stillborn or died. Two (twins) were dead when the mother, a primipara, was admitted. The mother recovered. One was premature, seven and one-half months and a stillbirth, although the heart continued to beat for a short time after delivery. The other three children died on the twenty-third, eighth and tenth days, respectively, in the order of their birth.

Prolapse of the Umbilical Cord.—This was the indication in two primiparæ. In each the cervix was long and less than two fingers dilated. The membranes were ruptured. The mothers and three children recovered (twins in one case). It is very doubtful if any form of vaginal delivery would have saved these children. A large percentage of Cesarean sections are performed in the interest of the child.

Neoplasms Obstructing the Birth Canal.—These have made the operation necessary in seven cases. In the cervix, preventing dilatation, two cases; sarcoma blocking the pelvis, one case; myofibroma of the uterus, two cases, and what was diagnosed as a dermoid in the culdesac, in front of the sacrum, twice in the same patient.

Atresia of the Vagina.—This was of such character that it was sufficient indication for the three Cesareans performed upon the same patient. It was coupled with a contracted pelvis which alone would have made the operations necessary.

Other Indications.—Operating, wholly in the interest of the child, upon moribund mothers, delivering antemortem rather than postmortem. Several of the eclamptics come within this class; also the case of pneumonia and a case of streptococcemia especially involving the cerebrospinal meninges. Some monsters may be delivered by Cesarean section with greater safety to the mother than in any other way.

Regarding the Sterilization of Women at the time Cesarean Section is done.—We do not advocate this except in unusual conditions.

Repeated Cesarean Section in the same Patient.—In our series, this operation has been performed thirty-one times subsequent to the first Cesarean section, twenty-one the second time, seven the third time and in one case the operation has been done six times, the last four times by the author.

Rupture of the Uterus in Labor following Cesarean Section.—This accident has befallen three of our patients. Two have already been reported. Both mothers and children recovered. In the first case the Cesarean cicatrix remained intact, the rupture taking place in

the thinned lower segment. The second was only a small opening in the lower end of the site of the old wound. The third case of rupture of the uterus was fatal to mother and child. This patient was a very thin, ill-developed and much deformed kyphotic dwarf. She was delivered of her first child at term by Cesarean section on January 2, 1912. The child was weak and it died from no other apparent cause on the third day. The mother had an uneventful recovery. At the time of the operation, upon closing the uterine wound, it was found that the deformity of the spinal column had forced the uterus forward in such a way that the uterine wound instead of being wholly in the anterior wall was in the midline directly through the fundus partly in the anterior and partly in the posterior wall of the uterus. In a few months this patient again became pregnant. She presented herself every few weeks throughout pregnancy for advice and observation. Her intelligence was of low grade but an intelligent friend always came with her. Each time they were warned by us to come to the hospital shortly before term, or failing that, immediately when pains began. This advice was disregarded until labor had been in progress eleven hours and rupture had taken place. The whole length of the old uterine wound was open. The child, placenta and much blood were in the abdominal cavity and the patient was in fairly well-marked shock. Very little active hemorrhage was found. The uterine wound was closed. The patient died in twelve hours. Apparently nature resented the attempt to publish new editions or to keep this physically and mentally unfit type longer in print.

The Danger of Rupture of the Uterus in Labor Subsequent to a Cesarean Section is a Real Danger.—Careful suturing and aseptic closure of the uterine wound reduces this danger. Close observation of the patient either in a hospital or under the care of a nurse during the last week of pregnancy and Cesarean section when necessary shortly before or at the onset of labor still further reduces this danger.

The most Favorable Time in Pregnancy in which to perform Cesarean Section.—Many of these patients come in as emergency cases in labor and we are unable to choose the time for the operation.

During the past three months, we have been able to elect the time for operation in seven cases, in whom the indications for this operation were known long beforehand to be present beyond a doubt. In all of these women, except one, the duration of pregnancy could be intelligently calculated. We operated a few days before term and before the onset of labor. No attempt was made to dilate

the cervix. It relaxed in each case after operation allowing ample room for drainage of lochia. We prefer this time, and, including the fifteen cases of eclampsia, who were not in labor when Cesarean section was performed, we have operated upon not less than thirty women by this method prior to the onset of labor. The mother is saved from labor pains and exhaustion; the child is not subjected to any compression.

Exception has been taken to our repeated assertion that Cesarean section is not resorted to in enough cases. The fear is constantly with us that we shall become too enthusiastic over this mode of delivery, that our judgment will be swayed and that we shall acquire the habit of employing this operation unnecessarily and that it may occur that we will merit the criticism already sometimes heard that we are working for a record. We would thus aid in bringing this truly beneficent operation into disrepute. And thus it comes about that it is our custom to weigh and consider the conditions in each individual case with all of the care and judgment which experience has given us and to decide upon that mode of delivery which will best serve the interests of a given mother and child. It is easier and safer for us to decide upon this operation than it was formerly and if we are wrong in our decision, if the operation is carefully performed under favorable conditions, no great harm has been done.

This operation has moved beyond the "last resort" idea. Its scope has been wonderfully broadened and wisely so, and yet there is too great a proportion of the medical and lay public whose conception of it and its results are those which obtained twenty or more years ago. It is to-day an infinitely simpler and safer operation than it was then. We confess to an occasional error in judgment. What operator is there who is honest with himself and with others who is active in any field of surgery, who can prove by after-results that he has always been in the right? And yet where we have delivered one case by Cesarean section and have had cause to regret that some other method of delivery had not been employed, we have seen at least ten cases in the past year in which we are positive that the interests of mother and child would have been better served had the delivery been by early Cesarean section and we believe that the true figure should be nearer twenty. In eight months of the past year we witnessed the death of three cases of placenta previa delivered vaginally by men of ripe experience and we believe that Cesarean section would have saved each one of these patients. They were in good condition. The shock and dangerous

hemorrhage came during and after delivery. That obstetrician is fortunate in his experience if he has escaped the care of a woman in labor whose tissues were whole and intact as they were created, whose unborn child was well and healthy but for some reason was out of proportion to the capacity of her pelvis, if he has not been called upon a few hours later, after some form of forcible vaginal delivery, to look upon a dead or much injured child and a mother, in many instances, lacerated and contused to a degree which is beyond our art to wholly repair. There are too many women who die or who date their change from buoyant health to an incurable invalidism from a labor similar to the one depicted, too many children dead or growing up mentally and physically deficient, not from heredity, not from faulty environment, but from injuries sustained during their birth. This is not an overdrawn or unique picture. It does not refer to experiences of the past. We witness too many such cases to-day and we are occasionally an actor in such tragedies. The contemplations of such results burn into our inner consciousness and we welcome a way of escape from them. We believe sincerely that earlier and more careful examination of each pregnant woman and a greater readiness to employ the Cesarean operation in well-selected cases offers that way in many instances and it will reduce the number of such cases materially. It is late in the day for us to look upon such results and say that we regret or to complacently say that we have done the best that we could, for too often it is not the truth. We are aware that there are communities in which complicated and difficult labors are the exception. This does not hold true of large cosmopolitan centers. There is a well-marked tendency for the difficult labors to gravitate to hospitals. To illustrate:

In six days of this present month, September 3 to 9, inclusive, in one division of the Lying-In Hospital, which represents one-half of its indoor service, there were thirty-one deliveries, as follows:

13 normal unassisted labors,
6 requiring low forceps,
2 breech deliveries,
1 twin delivery,
1 precipitate delivery in the elevator,
1 postpartum admission two hours after labor,
1 pubiotomy for contracted pelvis, long labor and outside manipulations; resulted in stillbirth from cranial hemorrhage due to forceps slipping,

1 craniotomy for contracted pelvis, in labor and under care of midwife forty-eight hours; podalic version and breech extraction to umbilicus by private physician; dead child.
1 embryotomy; child dead, shoulder impacted when admitted.
1 face L. M. A., partly dilated cervix, converted to vertex by Voorhees bag,
3 Cesarean sections for contracted pelvis, vertex incapable of being engaged. Result: three mothers and two children making good recovery; one child died shortly after delivery.

This is rather above the usual percentage of abnormalities for a given time in either service, but not markedly so. Had timely Cesarean section been employed in the case of pubiotomy and the two embryotomies, the lives of three well-developed infants would have been saved. Much more, three mothers would not have been subjected to the agonies of long labor, the dangers from sepsis and the frightful lacerations which were present in each case. Competent early examination would have revealed that this operation was plainly indicated.

Once start a series of these operations, and the history of the snowball which increases with every turn is repeated. These patients see the result of this operation and they come for subsequent delivery by this method. They know of friends who have had difficult labors, perhaps repeated stillbirths due to contracted pelvis, and they send them to be delivered by Cesarean section. Formerly it was necessary to persuade these women to allow this form of delivery even under conditions which presented no other way to secure a living child. To-day they accept our decision to deliver the child through the abdomen as readily as they do a forceps operation.

From time to time the author has been asked to attach his name to the technic of the Cesarean section which he employs. This has not been thought advisable because undoubted originators of methods of operating to which their names have been given have found that their technic is progressive and liable to change. Others describe and modify it, so that in a short time the originator is unable to recognize the first description of his technic. The writer is in no way sure that he can claim the original credit for the technic which he describes. He can say, however, that without any knowledge of its ever having been employed before, he did independently conceive this method, and was, in so far as he knew, the first to practise it in a Cesarean operation which he performed, on November 20, 1904 (C. N. 4830, Lying-In Hospital histories),

although it may have been in common use by others even many years ago. He has continued to employ it to the present time, with only slight modifications, and it has proved a good method for him in over 180 Cesarean operations.

THE OPERATION.

The operation advocated is as follows:

The abdomen is opened by a median incision 8 to 10 centimeters long from above down to the umbilicus. One or two gauze pads wet in warm normal salt solution are placed in the abdomen above the fundus of the uterus to hold back omentum and intestines. Often the uterus is found twisted upon its long axis, usually toward the right side. An assistant standing beside the patient opposite the operator makes pressure with his hands outside against the side walls of the abdomen, rotating the uterus so that its anterior wall looks directly forward and so regulating his pressure that the uterus is held well up to the abdominal opening until it is emptied of its contents, child, placenta and membranes, and until several of the deep sutures are in place and tied. This, however, is in no sense a maneuver to control hemorrhage. The uterus is then carefully opened with a scalpel so as to retain the membranes intact, by an incision a little longer than the abdominal opening in the midanterior surface of the uterus from just below the fundus downward. If the placenta is found beneath this wound, a not infrequent occurrence, it should be pushed aside or torn through and with the hand in the uterus, the membranes should be separated from the uterine wall while they are yet distended. Neglect of this precaution often means that they must be removed piecemeal, sometimes with much difficulty and delay, after the child is delivered and retraction and contraction have begun, and at the time when dangerous uterine hemorrhage is most likely to occur.

The anterior thigh of the child, or the one which is most readily found, is grasped, delivered, and breech extraction is done, turning the child after delivery of the shoulders, so that it faces toward the mother's face. Then with the middle and index-fingers of the right hand astride its neck and with the same fingers of the left hand in its mouth, making traction on its lower jaw, the head is carefully delivered so that there is no sudden jolting or lacerating of the uterus in its delivery. An assistant stands ready with two long clamps in which he grasps the umbilical cord. The cord is cut between the clamps and the child is taken away to have respira-

tions established, preferably into an adjoining room, so that the operating staff's attention may be given entirely to the mother. We now hook two fingers of the left hand into the uterus at its upper angle of the uterine wound and place and tie the upper deep suture, leaving the ends long. This is repeated at the lower angle of the wound and then with the right hand in the uterus, the placenta, menbranes and clots are removed. The first assistant now discontinues abdominal pressure and holds the uterus up to but not out of the abdominal opening by the long ends of the sutures already in place. The uterine wound is closed by two layers of sutures. The deep layer is of No. 2 chromic gut, interrupted and about 1 centimeter apart, passed through the uterine peritoneum, close to its cut edge, well out into the muscle and down to but not through the endometrium and out in reverse order on the opposite side. A double turn is taken in the first knot which will then maintain its position without the necessity of its being held by a forceps in the hands of an assistant at the risk of cutting or weakening an important suture with the forceps. The suture is drawn tight enough to bring the edges of the uterine wall into accurate apposition, yet avoiding tension which would blanch and constrict the tissues. The sutures are tied in three knots and cut short to the knot. The entrance and exit of the deep sutures are close to the cut edge of the uterine peritoneum and the short ends of these sutures render it more easy to completely bury them by the next layer which is a continuous suture of No. 1 chromic gut. Beginning at the lower angle of the uterine wound this suture is inserted and tied and the knot is covered by folding the peritoneum over it with subsequent stitches. Passing the needle well outside of the tissue included in the deep layer of sutures and parallel to the line of uterine incision, the peritoneum and some uterine muscle are caught up, alternately on one side and then the other, folding them over and completely burying the deep layer, much after the manner of the Cushing stitch in closure of intestinal wounds. This leaves no raw surface or sutures or knot ends exposed and thus reduces to a minimum the chances of subsequent adhesions of adjacent tissues to the uterine wound. The deep interrupted suture holds the two faces of the uterine wound in apposition through the whole depth of the wound. If any interrupted suture gives way its affects only the tissue held by that one suture. If a continuous suture gives way at one point, its force is weakened throughout its entire length. Every precaution should be taken to avoid adhesions and to secure strong, firm union of the uterine wound, so that the uterus may involute normally and take

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its position in the pelvis without restriction by adhesions and in the event of subsequent pregnancy the uterine scar will not rupture.

The pads are removed and the abdominal wound is closed in three layers. Dry sterile gauze pads are held in place by a snug adhesive strap across the abdominal wound which is an added support to the abdominal sutures. Elsewhere the dressings and binders are loose, so that the uterus, which is now in the lower part of the abdomen in the position occupied by a uterus after normal labor, may have free movement. The compression of the abdominal wall against the uterine wall is thus avoided and likewise the risk of adhesions between the two as was the case where the tight abdominal binder was employed. The uterus is not delivered from the abdomen at any time. The patient is placed in bed with the head of the bed elevated to favor drainage and descent of the uterus. In the uncomplicated case she suffers the pain and discomfort common to laparotomies for other causes but no more. Morphine in 1/8 grain doses is given by hypodermic injection as needed and the abdominal distention is relieved by a retained rectal tube or by a saline irrigation. Usually the mother nurses her child and at the end of forty-eight hours she is treated as a normal delivery. On the eighth day postpartum, she sits up in a chair and by the twelfth day she is ready to leave the hospital. Several of our patients have insisted upon going home on the tenth day, while others who were ready to go home on the twelfth day, for one cause or another, found it inconvenient to leave at that time, or else they lived at a distance and they were advised not to attempt to travel so soon. In the uninfected cases, the blood and liquor amnii which finds its way into the peritoneal cavity does no harm and no great effort is made to remove it.

We find the following advantages in the use of the small median incision entirely above the umbilicus: There is no danger of adhesions between the uterine and the abdominal wounds, and the uterus is therefore allowed to involute normally and take up its position in the pelvis without restricted mobility.

In the midline the abdominal wall is very thin; no important structures are divided and the tissues are quite elastic so that a small opening is all that is necessary for the delivery of the child. The small abdominal opening offers much less chance for the escape of intestine and omentum and less opportunity and necessity to handle the abdominal contents. Located above the umbilicus there is much less probability of the subsequent occurrence of

hernia through the cicatrix, for it is above the most dependant part of the abdomen which is subjected to the greatest strain when the patient is in the upright position. More support is also given at this point by the recti muscles as they tend to come together toward their upper attachments.

While we have not had an opportunity to examine all of the patients upon whom we have performed this method of Cesarean section, yet there is a considerable number who return for subsequent delivery in this way, or for other causes, and thus far we have not seen a hernia in any of our patients, except in one woman in whom the entire thickness of the abdominal wound broke down, and was closed by granulation. This patient developed a hernia several months later through the site of her Cesarean wound in the abdomen.

TREATMENT OF PLACENTA PREVIA BY CESAREAN SECTION, WHEN, IF EVER, IS IT JUSTIFIABLE?

BY
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IN presenting for the consideration of so distinguished an audience an article on the treatment of a topic so hackneyed and time worn as that of placenta previa, the reader feels that he is possessed of considerable temerity, and his only excuse for so doing lies in the fact that in the minds of some obstetricians there still seems to be a difference of opinion in regard to the best method of procedure to be adopted when this complication is encountered.

I believe that all of us are agreed, that where a case of placenta previa is under observation and supervision from an early date, where an accurate diagnosis has been made and watchful care and prompt interference by the usual methods are pursued, that the mortality and morbidity, both maternal and fetal, are much lower than in those cases who have had one or more hemorrhages before applying for medical aid. Taken in the main, however, the figures in a large series of cases show that the maternal mortality ranges from 15 to 20 per cent. with a fairly high morbidity, while the fetal mortality runs from 40 per cent. to 50 per cent., a truly serious complication demanding the utmost care and judgment on the part of the obstetrician.

While it is not my purpose to weary you with a long series of statistical figures which you all know as well as do I, still we cannot fail to realize that with such figures staring us in the face, the ordinary routine methods of treatment by packing, hydrostatic bags, rupture of the membranes followed by various operative procedures, etc., are very far from satisfactory, and it is the purpose of this paper to try to determine whether there is not a certain class of cases which can be treated in another way, namely, by abdominal hysterotomy, thus securing a reduction in the mortality figures given.

Although this operation had been suggested many years before and occasionally rather indifferently performed later, it was in September, 1901, that our esteemed secretary, Dr. Zinke, read an article before this Association entitled, "Is Cesarean Section Justifi-

able in the Treatment of Placenta Previa," in which he quoted the literature and statistics to date and placed himself on record with considerable force as endorsing the operation of Cesarean section on cases of central or complete placenta previa, especially if the patient happened to be a primipara. I cannot find that this admirable paper was received with marked enthusiasm by his audience nor that many of those present agreed with him, but rather the contrary.

In June, 1907, before the Section of Obstetrics and Gynecology of the American Medical Association, the reader presented a paper entitled, "Placenta Previa with Observations on 250 Cases," in which he advocated Cesarean section in a limited class of cases, later to be described, and his reception on this point by the members of the Section was nearly as enthusiastic as that accorded Dr. Zinke six years previously. Some of the discussers were inclined to intimate that such views savored either of the inexperienced youth or of the rabid enthusiast, but nearly all were agreed that the operation was unjustifiable, and unnecessary. The reader, however, continued in his perversity, and a year later in another paper before the same Section, this time on Cesarean section, rather timidly, it must be admitted, included certain cases of placenta previa among his indications for the operation. Greatly to his surprise, little opposition was at this time encountered and some approval expressed. Five years later, namely at the last meeting of the American Medical Association in June of this present year, we find on the program a paper devoted to the subject and expressing the opinion that the operation of choice in cases of central placenta previa is an abdominal Cesarean section. On the other hand no later than the annual meeting of this Association in 1912, Schwarz, of St Louis, formulated the conclusion that "no form of placenta previa as such ever offers a justifiable indication for Cesarean section," and "the cervical and vaginal tampon and the intrauterine use of rubber bags are safe and sufficient means for controlling hemorrhages and for securing sufficient dilatation for delivery through the maternal passages." He quotes a series of fifty-two cases, with a maternal mortality of 2 per cent., a truly remarkable showing, but admits a fetal mortality of 40 per cent. The general opinion of the meeting at this time was rather the reverse of the one eleven years before already referred to, most of the discussers favoring Cesarean section within limits.

Nothing is further from the thought or inclination of the reader than the idea of conveying to this audience the belief that he con-

siders that all cases of placenta previa should be treated by Cesarean section.

There is still a large field for the ordinary methods of procedure which will, he believes, always continue to find a use in the majority of instances, but, given a case of placenta previa centralis in a patient with a long cervix and undilated os with or without pelvic disproportion, with the child in good condition, will the patient not make a better recovery, with a living baby quickly delivered without loss of blood, by means of abdominal hysterotomy, than by the long drawn out and necessarily enfeebling manipulations needful to dilate the cervix and deliver her child in the usual manner? We believe that she will, and we desire to report certain cases in which this operation has been done with success.

Since 1891, in the service of the New York Lying-In Hospital, there have occurred 470 cases of placenta previa, and the operation of Cesarean section has been performed for this condition nineteen times by six different operators, all since 1905. The situation of the previa was central in nine cases, marginal in five cases, and no statement as to situation was made in the history in five cases; no case was more than two fingers dilated; all had had severe hemorrhages before entrance into the hospital, and in all it was a matter of rapid delivery being considered advisable; the patients varied from para-i to para-xiv; the youngest was eighteen and the oldest, thirty-eight. As to results: of the nineteen cases operated upon, one mother died, a maternal mortality of 5.3 per cent.; two children were stillborn, and three died before leaving the hospital, two on the first day, and one on the ninth, a fetal mortality of five, or 26 per cent.

Since a reduction in mortality is the main reason for our interest in the subject, let us consider a little more in detail the cases which died.

First, the one mother: the patient was a para-i in the eighth month with a central placenta previa. She had had outside manipulation and considerable hemorrhage. The child was stillborn and the mother died of septicemia on the twenty-first day. This was probably an unsuitable case for Cesarean section under any circumstances.

The other stillbirth was a case which was operated on purely on account of the mother who, it was believed, would not stand a prolonged dilatation and operative delivery, she being a primipara with an entirely undilated cervix, who had lost a great deal of blood. The child was believed to be dead at the time of operation. The mother made an uneventful recovery.

Of the three children dying after delivery, two died of atelectasis on the first day, and one of an infection of the middle ear on the ninth day.

It will be seen, then, that in this series the maternal mortality is cut down by about two-thirds of the usually accepted mortality, whereas the fetal mortality is cut almost in half. While the number of cases is too small to more than point the way, we believe that the indication is clear, and that when we encounter a primipara with a placenta previa either marginal or central, or a multipara with a central placenta previa in either case where the cervix is rigid or undilated, whether or not there is pelvic disproportion, provided the child is viable and the mother offers the ordinary safe operative risk, that Cesarean section holds out a better chance of saving the lives of both mother and child with fewer complications than any other method of delivery, always provided that the operation is performed by a competent and experienced operator and amid suitable surroundings.

THE ADVANTAGE OF CESAREAN SECTION OVER OTHER PROCEDURES IN BORDER-LINE CASES.

BY

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CESAREAN section a few years ago was the bugbear not only of the general practitioner but of the obstetric surgeon as well, to say nothing of the general public, owing to the very high mortality both maternal and fetal.

This high mortality was largely due to the fact that, like our early operation for appendicitis, it was only done in extreme cases, and usually then as a last resort. Very few surgeons, even half a decade ago, had the courage to advocate and perform a Cesarean section in a moderately contracted pelvis until either high forceps or version had been attempted, and the chances of either a living child or an uninfected mother were very poor.

For many years the chief subject for discussion among obstetricians in this class of border-line cases, cases of moderately flat and generally contracted or moderately deformed pelvis, has been whether high forceps or version was the safer method of delivery. By high forceps I mean forceps applied to a fetal head that is still above the upper plane of the pelvis and unengaged.

Statistics have proven that under the very best conditions high-forceps operations show an infant mortality of from 17 per cent. to 25 per cent., and that version in the same class of cases gives an infant mortality still higher, ranging from 25 per cent. to 45 per cent.

Markoe, in a large number of high-forceps cases at the New York Lying-In Hospital, has reported an infant mortality of 26.16 per cent. and Taylor in a report of the hospital tenement service makes the infant mortality for high forceps 25 per cent. Compare these reports with those on Cesarean section in the same institutions, where in 124 uncomplicated Cesarean sections up to 1908, Dr. Markoe reported an infant mortality of 2 1/2 per cent. and a maternal mortality of 6 1/2 per cent. During 1910 there were fifty-nine Cesarean sections at the New York Lying-In Hospital, out of which fifty-four mothers and fifty-one infants survived. I do not want to be understood as saying that the high-forceps operation should never be resorted to. But cases in which either high

forceps or version is justifiable are very rare and are not cases where there is a marked discrepancy between the size of the fetal head and the maternal bony canal.

A recent writer criticises the dictum "Never apply forceps to the head above the brim," and says it may be a safe rule to hand to the general practitioner, but should not apply to the experienced operator. I believe this precept should be repeated often and emphatically, for it is the beginner and the general practitioner that should be taught. We must depend mainly upon the larger hospitals for our statistics and precepts, but upon the general practitioner falls the great proportion of obstetric practice. He is the obstetrician of the masses. It must be remembered that in any case of contracted pelvis, either high forceps or version is just as formidable and dangerous for the mother as is Cesarean section, beside the question of grave danger to the child. As gynecologists, we all know what happens to the vast majority of these women. After being subjected to one or more of these operations they become invalids, victims of procidentia, rectocele, cystocele, vesicovaginal or rectovaginal fistulæ, and all manner of lacerations. As for the child, should it survive, how often is it the victim of injuries from which it never recovers, and just what percentage of the idiots and epileptics that fill our public institutions can trace their misfortune to this kind of birth, it is difficult to state. In Cesarean section the mother takes the same risk that she would from any laparotomy, and at the present day that is very slight. Any isolated practitioner can in these days of easy transportation obtain competent assistance. The lapse of a few hours, more or less, need not prejudice the result. The patient can nearly always be taken in comparative comfort to the nearest hospital, but if this is not practicable, there is no more objection to doing a Cesarean section in an isolated farm house than there is in doing any other laparotomy. The writer has crossed the Hudson in a small boat late at night, ridden many miles into the country, and then spent an hour or two making preparations for the operation with results that could not be improved upon anywhere.

A general rule suggested by Dr. Norris has been accepted by all authorities, "That when the true conjugate is less than 7 1/2 cm. in simple flat, and 8 cm. in generally contracted pelvis, Cesarean section at or before the onset of labor should be the elective operation.

Now I think we should add to this that in all cases where there is a larger conjugate diameter, but where after the lapse of a reasonable time the head remains unengaged above the brim of the pelvis,

Cesarean section is the safest procedure, both for the mother and child. Rules may be laid down for the obstetrician in well-marked pelvic deformities in very flat or narrow pelves, but this is by far the smallest class of cases that confronts him. Vastly more numerous are the women with moderately flat or narrow pelves, some of whom have suffered one or more previous labors, resulting in high forceps, version or even craniotomy, but always with the same result, a dead child or one that succumbed in a few hours or days.

Some of them are willing to try again, many others absolutely refuse to make another attempt, but go frantically from one physician to another seeking relief from their pregnancy, declaring that they had been warned by the last physician that attended them that they can never live through another childbirth and by all means not to make the attempt. Many of these women become regular patrons of the abortionist.

The time is undoubtedly coming when the general practitioner, the midwife, and even the patients themselves, will understand the importance of correct pelvic measurements so that these border-line cases may be recognized in time to prepare for them, but that time is still a long way off, especially in large country districts and in the small cities and towns where there are no maternity hospitals or specially trained obstetricians, and in many instances where the physician sees the patient for the first time after labor has begun.

The discrepancy is by no means always due to an abnormally narrow pelvis, but is frequently due to an exceptionally large child, out of all proportion to the pelvic outlet. It may be due to an impossible presentation or to a hyrdocephalic head or an ossified head.

There are many other conditions which should be easily recognized as indications for Cesarean section, such as cancer or other tumors of the uterus or canal, cicatricial contractions of the vagina or cervix, placenta previa, eclampsia; in mothers who have been subjected to fixation operations; in prolapse of the cord, especially where there is pulsation.

There is another condition which, if possible to diagnose, should call for immediate Cesarean section, and that is the very short cord. A short thick cord, anywhere under 8 inches in length, is an almost unsurmountable obstacle to a safe delivery and, although comparatively rare, should always be considered in extremely tedious and protracted labors, where there is no other apparent obstacle.

Some writers tell us that in many of these border-line cases by careful measurements and manipulation it is comparatively easy to

determine the relative diameter of the fetal head and the bony canal, and that when the discrepancy is not too great, high forceps may be safely applied. Now, there may be a few men gifted with that degree of skill, but this is not altogether safe teaching, for where the natural forces fail to engage the head, it is not likely to be accomplished by mechanical force without serious damage to either the head or the canal, or to both. It is easy to understand how many a physician is driven to apply forceps in these cases greatly against his better judgment, by the dread of the patient and the prejudice of the family against the knife. When, however, such an emergency arises and the obstetrician feels justified in attempting forceps, let him be sure of two things: he must be clean and he must be gentle. One of the latest text-books on obstetrics describing the high-forceps operation says, "The operation as described is very difficult, especially if the degree of contraction is considerable. The obstetrician may be compelled to use the entire strength of both arms."

I believe such teaching is extremely dangerous, for it must be remembered that it is not the proper use of forceps that does the damage, it is the abuse of them. The time is past when the strongest man is the most skillful obstetrician.

However important a fair knowledge of pelvimetry may be, of far greater importance is a clean, careful obstetric technic that includes not only his own hands and person, but the person, clothing, bed and surroundings of the patient. When he has safeguarded his patient against infection, neither he nor the surgeon need feel any great anxiety about the result, if a Cesarean section has to be resorted to later.

Pubiotomy as an aid to the high forceps seems to have very little to recommend it. I have had no experience with it myself, but judging from two patients who came to me subsequent to pubiotomy operations, one with vesicovaginal fistulæ and the other with extensive lacerations, cervical, vaginal and perineal, it is not to be classed with the clean-cut abdominal section which, when carried out with a proper technic, leaves no bad results behind it either to the mother or the child.

Craniotomy upon a living child is not to be considered; the slight risk to the mother of a Cesarean section can never justify the wanton sacrifice of the child and, furthermore, the risk to the mother from craniotomy is just as great, if not greater.

The Duehrssen schnitt or the vaginal Cesarean section, a splendid procedure when the obstruction to a ready delivery is the undilated

uterus itself, does not in any way enter into the question, whereas in these cases the bony pelvic canal is too narrow for the passage of the fetal head.

Accouchement forcé, or premature delivery, may be a capital procedure, especially at maternity hospitals where the physician has a perfect understanding with his patient for months before her term, but does not apply to the general practitioner whose patients are scattered over a large area where there is no chance for any preliminary preparation. In such cases I have had all my experience with Cesarean section, altogether eleven cases. The first six, all done upon either extremely deformed or extremely contracted pelves, I reported a year ago. During the past year I have had five more; four of these were what I have designated border line cases.

CASE I.—Mrs. C. aged twenty-eight. Dr. C. J. McCambridge reported to me by telephone that this young woman had been in labor all day, that the child was a large one; that the head did not engage in the pelvis, and he was certain some operative procedure must be resorted to. He explained that this patient had given birth to two previous children, one by high forceps and the other by version and forceps, and that both of these children had been lost, and he was loath to attempt either of these procedures in the face of this mother's previous experiences. After seeing the patient I advised Cesarean section which was assented to. She was at once removed to my private hospital and high Cesarean section done. A fine 12-pound boy was delivered. Mother and babe left the hospital the fourteenth day.

CASE II.—Also referred to me by Dr. McCambridge, who told me he was about 12 miles in the country and asked me to come out prepared to do another Cesarean section. With an assistant and nurse I arrived at the house about 10 P. M., where I found a very large fat woman, forty years of age, with a moderately flattened pelvis. She had been in labor since early morning, but the head was not engaged in the pelvis. This mother had given birth to three previous children, all with high forceps; two had been born dead; the third had lived three days with a fractured depressed skull, and she realized that this was probably her last chance for a living child. After careful preparation Cesarean section was done at the house and a very large girl baby was delivered. Both patients did finely.

CASE III. Mrs. K. A young primipara referred to me by Dr. Dederick of Rhinebeck. The doctor had noticed no special dis-

crepancy about the pelvic outlet until after the patient had been in labor all day, when he found the head still unengaged above the pelvic brim; high forceps were attempted but unsuccessfully. I was then called and asked to do a Cesarean section. The patient was taken to the Rhinebeck Hospital, where I found a straight moderately contracted pelvis. In this case, had the doctor used sufficient force, he might have succeeded in delivering a dead child and terribly lacerating the mother. As it was, by section we delivered a large male child which, though resuscitated with some difficulty, with the mother made a good recovery.

CASE IV.—Mrs. R. Finely developed primipara; thirty-eight years of age; had been in labor twenty-four hours when I was called to see her by Dr. Grace N. Kimball, who told me that, although the cervix had been fully dilated for the past twelve hours, there had been no progress. Upon examination I found an apparently normal pelvis and could easily make out a right brow presentation well above the brim. By bimanual manipulation a firm mass in the left pelvic fossa could be easily identified as the occiput. The patient was having severe and frequent pains which had no effect except to force the shoulder down and rotate the head further up into the left pelvis. I advised a Cesarean section, as I did not believe this child could be delivered alive by any other method. Patient was removed to my private hospital and section done at once, and a 10-pound child delivered alive. There was a moderate succedaneum of the right brow, including the right eye. The occiput was very much elongated and was flexed backward between the shoulders, remaining in this position for several days, before the baby began to show very much improvement, then the muscles of the neck and back began to relax and he began to nurse regularly and take some interest in life and by the end of the second week went home with his mother. By gentle massage and manipulation his head assumed a normal shape and the muscles of his back became normal. He is now a fine boy of ten months.

CASE V.—Mrs. L. Called in consultation by Dr. E. H. Heston, found small primipara twenty-six years old, with straight, moderately contracted pelvis. Patient had been in labor twenty-four hours, cervix was well dilated, but the head remained above the brim and unengaged. I advised that the patient go to the hospital for Cesarean section, but this was so strongly opposed by patient and family that I finally consented to try forceps as the child was a small one. I soon found that with the amount of force I was willing to exert that the head would not engage. The patient was then

removed to the hospital and section was done. Neither the child, a 7 1/2-pound girl, nor the mother, suffered any ill effects from their experience, but left the hospital on the twelfth day.

In all my cases I have used the high abdominal incision, opening the uterus *in situ* as soon as it is exposed, carrying the uterine incision well over the fundus. With this incision the operation can be done through an abdominal opening about one-half the size of the lower incision, and, as Dr. Davis has said, the abdominal and uterine wounds are separated by the contraction and involution of the uterus. Another advantage is that the uterine incision is made through a part of the organ away from the larger blood-vessels, and hence there is less danger of hemorrhage, and I believe also a portion of the uterus less likely to rupture in subsequent labors. For protecting the intestines and to absorb any fluids which are likely to overflow, one or two gauze pads, 6 inches wide, 6 or 8 feet long, are useful.

This operation seems to me to be the ideal one in all cases where the operator feels confident that he has no previous infection to deal with, but in cases where there is suspicion of infection, I believe it would be much safer to open the lower abdomen, lift the gravid uterus out of the abdomen, thoroughly protect the abdominal cavity before opening the uterus, when the operator is in a position to proceed with a hysterectomy as a further safeguard against infection.

It has been said that Cesarean section has caused a considerable number of ruptured uteri. We can safely say that timely Cesarean section would prevent most, if not all, ruptures.

It is certainly not "good obstetrics" to allow a woman who has had one Cesarean section to proceed in any subsequent labor to a point where rupture is imminent. Recent statistics, however, show that with our present technic these accidents following Cesarean section are comparatively rare.

DISCUSSION ON THE PAPERS OF DRS. DAVIS, MCPHERSON AND POUCHER.

DR. CHARLES N. SMITH, Toledo.—I did not intend to open the discussion on these papers because I have had no opportunity to prepare for it. However, there were some things said in the discussion on Cesarean section, especially as regards placenta previa, that I would like to consider.

One remark which impressed me very favorably, without referring to the patients who accept our decision, is that we can do abdominal delivery as readily as forceps delivery, and it is really

remarkable how readily patients at the present time not only accept Cesarean section but request it. In my opinion, when they accept Cesarean section as opposed to high-forceps delivery, they invariably chose the safer of the two procedures.

There is one question I would like to ask Dr. Davis, which was not mentioned in his paper, and that refers to the condition of the child delivered by Cesarean section. In what proportion of children delivered by Cesarean section is there a delay or difficulty in establishing respiration?

Personally, I have had quite a bit of difficulty. I have done twenty-three abdominal Cesarean sections, two of these were done in the presence of placenta previa centralis, one of them particularly for that sole indication, and the other in the presence of transverse presentation in a woman who had lost three children previously in labor and who solicited this Cesarean section.

The first case was a woman, twenty years of age, who was seen at St. Vincent's Hospital, having had a profuse hemorrhage. She was a primipara, with a very small vagina, long, conical, rather firm cervix, with not much dilatation, and placenta previa centralis. We did immediately an abdominal Cesarean section, and saved the mother and the child.

The second case I wish to refer to especially was a woman, thirty-two years of age, on whom I did Cesarean section last May. She had been confined previously at three different times, once with transverse presentation, others with breech presentation. In the transverse and one breech presentations the child was delivered dead. In a third breech presentation, the child lived for some few moments only, so that she had lost three children in delivery, and in February or April she, unknown to her attending physician, intended to have Cesarean section performed this time; that she was going to have a living child if possible. I saw her and arrangements were made according to this plan. If she had a head presentation, it was thought best to allow her to deliver herself or to do it by forceps. If she had an irregular presentation, or if there were any complications which led us to believe she could not be safely delivered of a living child, Cesarean section must be done, and arrangements were made to take her to the hospital to have this done. She was taken with slight pain and profuse hemorrhage in the night, and I was quickly notified and called to see her. I found her with very little pain, with dilatation of about an inch, the head in the left iliac fossa, the back anterior, the occiput anterior, and the placenta seemingly occupying the entire lower segment of the uterus. She was bleeding rather profusely, although the pains were not hard. She was taken at once to the hospital, we did a Cesarean section, delivered her of a living child, and her life was saved, so we had in that particular case what I hold to be the proper indications for Cesarean section for placenta previa and some other indications. In this case she had the history of repeated fetal death, a transverse presentation, which might have been later, had other conditions been normal, a placenta previa centralis, the patient at full

term, the mother being an ideal surgical risk, and a living child, with the patient in the hospital. I believe it is in those cases of placenta previa only, where we have a placenta previa centralis that Cesarean section is absolutely indicated. Possibly in some instances of placenta previa marginalis it might also be indicated. I have done it in placenta previa centralis, and certainly the results to the child must be considered. We have got to consider the unborn child, and the chance of the mother to be delivered of a living child, and do Cesarean section in some instances of placenta previa, even though we are practically sure we can save the mother's life by other methods of procedure.

DR. JAMES A. HARRAR.—I have had the pleasure of seeing Dr. Davis do a great many Cesarean sections, and I might say there is no better operation. At the New York Lying-In we all follow his technic. I have made twenty-three Cesarean sections, using Dr. Davis' incision, with perfect satisfaction.

As to the condition of the scar in subsequent pregnancies, it is something we should consider when we recommend Cesarean section, especially in the cases long in labor where there is a suspicion of infection. We know in doing a vaginal Cesarean section how prone the uterine wound is to slough in the presence of infection. In these late cases, where we do abdominal section, we often get a similar sloughing of the uterine wound, so that in future pregnancies we have a weak uterine scar.

In a study of the uterine scar following Cesarean section made several years ago, we found absolutely no scar tissue between the visceral peritoneum and the uterine mucosa, where the wound had healed by primary intention. The uterine muscle was solid throughout the wound, the muscle cells having apparently regenerated and many of them could be seen under the microscope running directly across the line of the old incision, as located by the linear whitening on the peritoneal surface.

As to the employment of the operation in placenta previa, we are confronted with a problem that requires careful consideration. The mortality figures in placenta previa are notoriously of little value, because we do not know the condition in each case, how it was handled before it came to the operator's hands. Among a series of 460 placenta previas which I had occasion to report recently from the Lying-In, there were forty-eight primiparæ that were delivered by the vaginal route. Of these, one mother died and thirty babies were lost. Cesarean section has little better than this to offer as far as the mother is concerned, but it does increase the chances for the child. On the other hand we must know the value of the child thus delivered alive by Cesarean section. As but a third of women with placenta previa go to term, we must anticipate an infantile morbidity of 66 per cent. from prematurity. Personally I would limit the indications for the operation in placenta previa to primiparæ with long and but slightly dilated cervices, the mother at or near term, and with mother and child in good condition.

DR. H. G. PARTRIDGE, Providence, R. I.—I did not expect to be

called upon to take part in this discussion, but I am very glad to be here and to have heard these papers. I heard two of the papers, but not all of the one read by Dr. Davis.

I am especially interested in the subject of Cesarean section for placenta previa, because it seems to me, placenta previa is one of the most serious conditions we have to meet. I have never seen a Cesarean section done for that cause. I have seen cases of placenta previa that showed a long rigid cervix, but these have been very few. Practically all the cases I have seen have had a soft, boggy, easily dilatable cervix, and within my own personal experience there has been no case which I have thought, after hearing these papers, would have been suitable for Cesarean section. Within a week we had a case in the Lying-In Hospital here which would have been ideal for vaginal Cesarean section. Vaginal Cesarean section was done, the mother being in good condition afterward and the baby born dead.

Another thing to consider is that many of these cases are premature; that is to say, the baby is not more than six or seven months old, and if you deliver by Cesarean section, you do not get a viable baby. That is a point we have to consider. I cannot help but feel—perhaps I am a little conservative—that there is more danger in doing a Cesarean section than in doing a high forceps. As I have seen high forceps done by men competent to do it in patients who are not already too weakened, there has been very little mortality, whereas there is a distinct mortality in any abdominal section. That is my own conclusion from observation.

DR. E. GUSTAV ZINKE, Cincinnati.—It is only natural that I should take an interest in this subject; an interest, indeed, which has been earnest, serious and protracted. No doubt there are a good many cases of placenta previa which had better be treated by Cesarean section from the beginning than by any other method. No man is a good obstetrician, or a good surgeon, who is guided by one rule only. Every man must study his cases carefully and then he must determine, from the conditions with which he is confronted what is the best course to pursue. The signs and symptoms are the witnesses, and he the judge. There are, undoubtedly, many cases of placenta previa, perhaps the majority, that can be successfully treated for both mother and child, by the Fry or the DeLee method, by balloon and, even by metal dilatation. I have very little use for the latter mode of dilatation.

When we are able to observe these cases constantly, and have them in favorable surroundings, we may see what we can accomplish by way of dilatation of the os and delivery of the child *per vias naturales*. But when we have a case of placenta previa centralis, complicated by an oblique or transverse presentation, the most skilful use of the tampon will do no good; and, before you succeed in dilating the uterus sufficiently either by this or any other method, the woman is usually so exsanguinated that, if she does not die during the delivery, she may expire soon thereafter or go by way of septic infection a few days later. The child, as a rule, is lost under these

circumstances. Version and slow delivery of the after-coming head always means death to child.

In primiparous women, the victims of placenta previa centralis and an oblique presentation, I would not attempt anything except a Cesarean section. There are cases of marginal and lateral placenta previas in which, at times, the hemorrhage is difficult of control. These are the cases in which a pathologic condition exists. The placental structure is not limited to the decidua serotina but is so implanted that the chorionic villi penetrate the uterine musculature; here, separation of the placenta is very slow and always associated with great loss of blood.

Under normal circumstances, the uterine wall is of the same thickness in every part of the organ, the placental site not excepted. Normally the placenta does not occupy the muscularis at all, only the serotina. In normal placental implantation, the hemorrhage is hardly ever excessive and can usually be controlled. But when the placental villi have buried themselves into the uterine musculature, we have free and uncontrollable hemorrhage, and a timely Cesarean section will save both mother and child. With the other methods, just enumerated, you will have a fatal result from the start so far as the child is concerned; and, in many instances, the life of the mother too is sacrificed.

No man has a right to perform Cesarean section who is not able to provide the patient with the necessary aseptic precautions and who is not thoroughly familiar with the technic of the operation.

Every case of placenta previa is a serious surgical case and belongs in a hospital as truly as a case of appendicitis or any other grave surgical condition. If the diagnosis of placenta previa is made early, there is no good reason why the patient should not be sent to a hospital, even though it be ten, twenty, or fifty miles from the patient's home.

The diagnosis of placenta previa can be made, in some instances during the period of viability, and nearly always some time before the beginning of labor. If the condition manifests itself late in the ninth month, or when labor begins, it may still be possible to convey the patient to a hospital if it be conveniently located.

It is quite a satisfaction to me to be understood at last. I do not claim the credit of having been the first to advocate Cesarean section for placenta previa. I have been only one of the pioneers fighting for the justification of this operation in this serious obstetric complication. Lawson Tait was the first to suggest it. The operation was performed in St. Louis by Hypes, and Hulbert in 1890; by Slight, Granite City, Montana, 1891; by Bernais, St. Louis, 1898; by Lawson Tait, the same year; by Donoghue, Boston, 1900; by Hare, Boston, 1901; by Covington, Bellfontain, and by Gillette, Toledo, Ohio, 1901. In spite of the fact that the operation was performed late in every one of these cases, only three mothers died and all children lived. I know of no surgical conditions in which the results have been so favorable from the beginning, as in cases of Cesarean section for placenta previa. Since then the

operation has been accepted, at home and abroad, by many operators. It is now performed quite frequently for the relief of this condition and, almost without exception, with favorable results to both lives concerned.

Just a word with reference to Cesarean section for eclampsia. I have put myself squarely on record on this question. Cesarean section is rarely, if ever, justifiable for this condition. There might be a justification for this operation in eclampsia had we no other means to obtain far better results in the treatment of this malady. It is a pity, indeed, that a remedy, which has served hundreds of good and able practitioners well for the last sixty or seventy-five years, should be so utterly discarded and shamefully neglected by some of our best men at home, and by nearly everybody abroad. It seems that the obstetricians of the continent of Europe especially have no faith in the value of veratrum viride in the treatment of puerperal eclampsia. They do not even speak of it. Veratrum viride, a fresh preparation of it, promptly and properly employed, rarely fails to give prompt relief. Indeed, I have never seen it fail in any case in which it was used properly from the start. There are cases of eclampsia which cannot be cured by any form of treatment. They are fatal from the start. Those are the cases due to an effusion or hemorrhage into the brain or spinal cord or both, and those which are caused by yellow atrophy of the liver. No remedy, not even Cesarean section, will cure these cases. I feel almost certain that the cases, which will not respond promptly to the proper administration of veratrum viride, cannot be saved by Cesarean section. Still I am in favor of this operation if veratrum viride has received a fair trial and the patient does not respond. Under such circumstances I would have no objection to Cesarean section; although I have my doubts whether the patient will profit by it. My friend, Reuben Peterson, with whom I had a controversy on this subject in Rochester, N. Y., last April, says: "Dr. Zinke will try veratrum viride until the case is hopeless and then make a Cesarean section." He does not put me on record squarely. I protest against his statement. I have never seen a case in which the first hypodermic injection of twenty drops of veratrum viride did not at once affect the patient favorably; the pulse becomes better and the general condition of the patient is almost invariably improved. So long as the patient's consciousness returns after every attack, so long as her pulse remains normal, just so long is there little danger even if the attacks recur. I am satisfied there are men in this audience now who have seen patients, having from five to ten, and more, attacks of eclampsia, whose mind cleared up perfectly after every seizure, even without the use of veratrum viride, and then deliver themselves. If I had a case in which the first eclamptic seizure left the patient's mind cloudy and that after the second or third attack the coma increased, I would consent to a Cesarean section, though with little hope of saving her life.

Veratrum viride should have a fair trial. It is our duty to use it. We owe it to those brave and good obstetricians who have

preceded us, and who have spoken in favor of this drug in words of eloquence the like of which we rarely hear. We owe it to the memory of these earnest truthful men for the sake of suffering womankind, that we perpetuate this remedy; and that we continue to remind those who have no faith in it, that it is a remedy of more than ordinary merit.

DR. MCPHERSON (closing the discussion on his paper).—There are only two points I want to refer to in connection with what has been said. Dr. Harrar quotes forty-eight cases of placenta previa with one death among the mothers. I agree with him perfectly about that, but these are forty-eight cases of **placenta previa.** They are not forty-eight cases of central placenta previa in primiparæ. They are not within the limits of the rule or statement which I laid down for the indications. If I had said in my paper that I thought every case of plaecnta previa ought to have a Cesarean section done that percentage would be absolutely out of proportion but we do not now how many of those forty-eight cases were cases which met the indications which I gave, so that I think there is room for some argument.

The next point is with reference to the remarks made by Dr. Partridge, namely, how to keep premature babies alive. They are hard to keep alive, but a premature baby, whose mother has been fourteen hours in labor, and in a gradually increasing state of exsanguination, is harder to keep alive than one delivered directly after the diagnosis is made, and we must not think that every premature baby is bound to die, because we have saved a great many of them in private practice. In cases of placenta previa a great many premature babies die, on account of the prolonged labor.

DR. DAVIS (closing the discussion on his part).—As to the remarks made by Dr. Smith relative to the establishment of respiration of these children following Cesarean section, we find comparatively very little trouble in that respect, and yet every now and then we do see cases of children where they do not breathe well for some cause or other, but the proportion is rather small. I recall two cases in which I left the operation for ten minutes, stopped it altogether, in order to come to the rescue of the child. Those were cases where we had intense uterine contractions, so that the uterine wall was contracted and thick and there was practically no bleeding. We placed a pad over the wound, left the mother temporarily, and took care of the child.

In relation to the uterine scar, we have done these operations repeatedly upon the same patients and in many of them we are unable to find the scar at all. In a great many cases we find it is strong and firm. A week ago I found one case where the region of the old Cesarean wound was evidently fully as strong as the rest of the uterine tissue. We make it a point to go directly through the scar. We believe it is better in these operations to have one location of scar tissue rather than two or possibly three with short muscle fibers growing between them. In one case of rupture of the

uterus, the scar withstood the strain and the rupture took place down in the thinned out lower uterine segment.

Dr. Partridge is to be congratulated upon the ease with which he does high forceps, because we do not find it such an easy operation in the cases that come to us in New York.

There are indications for high forceps, I grant, and there are some cases where the high forceps is a good instrument. Take, for instance, a woman with a large flat pelvis, a multipara, with lax abdominal walls and lax uterine walls, where she does not engage the head, where one or two pulls of the high forceps overcomes the obstruction, and brings the child down into the pelvis easily, it is all right, but high forceps, as we understand it, is one of the most dangerous operations we have anything to do with.

The remarks made by Dr. Zinke as to placenta previa were very interesting. I have seen a number of cases that were not central, but were well-marked marginal cases of placenta previa, where, I believe, Cesarean section was a very much better operation than in some similar cases where a Cesarean section was not done, where so-called dilatation was tried and the patient died. I believe such cases would have been saved by Cesarean section. As a matter of fact, we do not dilate as much as we may think we do. We hear a good deal about dilatation of the cervix. We do not dilate, it is a matter of laceration. Up to three or four fingers' dilatation, the lacerations are not pronounced, but they are still there, and if you extend the dilatation to what we call full dilatation the lacerations are extensive. After that, dragging the child through the canal, we have quite as much laceration as we care to deal with.

With reference to the abnormal location of the placenta it was remarked at one of our meetings years ago by some one that cases of placenta previa should be classed as ectopic gestation. Dr. Zinke brought out the point that the placenta is located in an abnormal part of the uterus, and he has observed it correctly. The placenta sends digitations into the muscle and the muscle is weakened, so that after the placenta is removed we get hemorrhages from the placental site because of its inability to contract. We cannot pack, we cannot sew against that, as the tissues are lax and flop about. The muscles do not contract. The woman has already had considerable hemorrhage, and after hemorrhage has taken place, in our attempt to repair there is still bleeding, and many of these women die.

Cesarean section is a comparatively easy operation, and the surgeon does not necessarily need to be trained as an obstetrician in order to perform it. Any surgeon who is accustomed to doing abdominal operations finds no difficulty, I am sure, in doing a clean-cut straight-away Cesarean section, and it is a safer operation than any vaginal delivery of the operative type in many of these cases.

Dr. Poucher (closing).—I do not feel that I can add very much to the argument made by Dr. Davis on this subject. I do not think any of us can say too much upon the subject of Cesarean section because, first, it seems to me, the more it is discussed, the more it is studied, the more there is printed on the subject, and the

pros and cons thoroughly understood, the better the chance in educating the general practitioner as to the necessity for it in a great many of these cases, especially cases in which the general practitioner is apt to apply high forceps.

Now, I cannot agree entirely with Dr. Partridge about high forceps being as good a procedure in some cases as Cesarean section. I used to apply high forceps a good deal. I used to dread a Cesarean section as an operation. At the present time, I dread a good deal more applying forceps to the head above the brim of the pelvis than doing a Cesarean section, and I feel the patient is freer from the danger of infection and in better condition. There are a great many mothers who, it seems, have more difficulty than others. The uterine canal to all appearances may be normal, but these mothers have the habit of having children that are too large for the canal. There are certain mothers who run to large children, particularly a mother that weighs 80 or 100 pounds. I have known several instances, two cases in particular which I reported, where a mother lost two children by an attempt at high forceps, and the other lost three, because the infants in everyone of these cases were out of proportion to the size of the canal, which was not markedly contracted. Some of these cases are easily delivered perhaps by high forceps, but the majority of them, as Dr. Davis has said, we can meet much better by a Cesarean section, done before we have complications.

RUPTURE OF THE SYMPHYSIS PUBIS IN LABOR.

BY
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THE extreme rarity of this accident is justification for the report of the case which follows. Careful research shows that there is but one case in from 30,000 to 60,000 births, including both spontaneous and traumatic varieties.

While recent writers state that there are about 150 recorded cases in literature, these figures cannot be verified, and Kayser's estimate of about 130 cases, *plus* those since recorded, would indicate that the more correct estimate is about 140. It may be safer to state that the estimate varies from 140 to 150.

It has long been the teaching(1) that the articulations of the pelvis become softened and relaxed during gestation on account of the secretion from the synovial membrane lining their surfaces.

The extent to which this softening occurs is not stated by the authors who refer to this phenomenon. I do not think that it is so great as to cause difficulty in standing or walking in very many cases, at least such a condition has never been brought to my attention.

The percentage of cases of rupture which are caused spontaneously varies much according to different authors. Bar, the celebrated French obstetrician, considered forceps delivery, in certain conditions, responsible for most cases, but other authors are equally emphatic that the forceps has nothing to do with causing the fracture. Rudaux gives twenty-seven out of a total of ninety-eight cases as due to spontaneous rupture, which, if accepted, will show that only about 27 per cent. of all reported cases are spontaneous. In support of the fact that spontaneous rupture may occur, Boisliniere relates a case of eclampsia in which spontaneous rupture of the symphysis is reported to have taken place suddenly during an attack of eclampsia in a primipara of twenty years. In this case a crack was heard and the child was easily delivered by forceps.

Ahlfeld(2) records a case in which the pelvic articulations ruptured during labor, although the fetus was expelled within an unruptured bag of membranes—a fact which showed that the intrauterine pressure could not have been excessive.

In the majority of instances rupture of the symphysis is due to excessive or misdirected traction in forceps delivery. Of twenty-three cases of rupture of the symphysis collected by Havaje-Weiz (3) forceps had been used in eighteen. A rupture may occur in an attempt to deliver by forceps an unusually large head; or a normal-sized head through a contracted pelvis, or a head in a persistent occipito-posterior position. It may occur also with forceps applied to the head at the brim and forcible traction made in a direction anterior to the pelvic axis. Lusk(4) states that in a rupture of the symphysis no increase in the capacity of the pelvis is possible without simultaneous rupture of at least one of the sacroiliac synchondroses. At the symphysis the rupture is apt to be complete, at the synchondroses the rupture is usually confined to the anterior surface. It may take place in the median line, or upon the side, between the cartilage and the pubic bone. If the injury be slight, the synovial cavity of the symphysis may not be injured. At the synchondroses, opening of the joint cavity is inevitable. An excessive degree of the lesion is accompanied by laceration of the vagina, the bladder, and the intervening connective tissue.

The accident may be recognized at the time of its occurrence by feeling the bones give way, by hearing the bones snap as in the case of eclampsia referred to above, or it may not be detected until the patient complains of pain on moving, flexion or abduction of thighs or attempting to sit up or walk.

Complications may occur in the form of rupture of the anterior vaginal wall, rupture of the bladder, severe hemorrhages from rupture of the veins about the vestibule, or suppuration of the joint or soft parts.

The following is a brief report of the case occurring under my observation:

CASE I.—Mrs. S., aged twenty-three, para-ü, the first child being born in New York City in 1910, forceps delivery. She was seen at 9.30 A. M. November 19, 1912. She had been in labor for ten hours, but had had practically no pain from the start having been given a tablet of H. M. C. by her attending physician at 4.30 P. M. the previous day. She had been in the second stage for two hours, and one hour previous to my arrival forceps had been applied and forcible traction made intermittently with no progress. Chloroform had been given for one and a half hours. I removed the forceps and an examination showed the occiput to be directly posterior. Because of the large caput, in order to make a diagnosis of the posi-

tion, it was necessary to pass the hand into the vagina, which was quite edematous, and without difficulty the head was at once turned to an L. O. A. position. The forceps was then reapplied to the head in the L. O. A. position and with unusually moderate traction the head was delivered. The child was profoundly asphyxiated, but respiration with the aid of the pulmotor was finally established.

While working with the baby and before the placenta was delivered, it was noted that there was considerable hemorrhage. The placenta was delivered at once by Crede's method with a continuance of the hemorrhage. Close examination revealed the fact that the bleeding was not from the vagina, but from a rent anterior to the vagina, near the urethra, and in an effort to pack this to check the bleeding, the finger followed back between the ends of the symphysis which were separated 2 1/2 inches. Pressure to the crests of the ilium was made at once and the wound in the soft parts packed with gauze. Encircling strips of adhesive plaster were put around the hips holding the severed ends of the bones in close apposition. She was catheterized for four days.

The puerperium was slow, one feature of the case being a continuously rapid pulse for two or three days, but this gradually subsided. The plaster was replaced by a specially constructed pelvic binder with straps and buckles and at the end of six weeks the union was complete. During the third week she developed a phlegmasia of the left leg and thigh with more or less constant pain over the inner aspect of the thigh. There is no pain now, but whenever she is on her feet long at a time the swelling recurs. There is no mobility of the symphysis or pain in this region.

In passing, I wish to say a word in regard to the management of occipito-posterior positions, and the absolute necessity of a positive diagnosis before forceps is applied. Occipito-posterior positions in normal-sized pelvis and head, must rotate anteriorly if birth is to be accomplished without great risk to the integrity of the soft parts. Nature does accomplish this in a large majority of cases, but only after a long, tedious labor and with great risk to the life of the child. If born as an occipito-posterior a severe tear of the perineum is practically inevitable. I am aware that there are exceptions to this rule; I have several times been astonished at the delivery of occipito-posterior cases without rotation with as little trouble as if it had been an anterior position, but these are decidedly the exceptions. Given a case with the history of no advance after one and one-half to two hours in the second stage, and an examination reveals an occiput posterior, a manual or forceps rotation will usually be very easily

performed and with reapplication of the forceps in the new position the delivery can be easily accomplished. For the forceps rotation, the solid-blade instrument is much preferable.

The following abstracts of papers are given to illustrate the usual type of cases of rupture of the symphysis occurring:

Kriwski(5) states that the condition does not occur more than one in 10,000 births, and not so frequent according to some authors. Kayser(6) reports three in 94,000 births.

According to Winkel there were 124 cases altogether reported in literature up to 1907, but Kayser states that up to 1903 there were 130. The cases to the year 1898 are collected by P. Rudaux(7), this series showing twenty-seven spontaneous, seventy-one traumatic. Chrobak reports three cases out of 64,149 births.

The author states that the total number of cases reported in literature that he can find is 134.

The causes assigned are: infantilism; contracted pelvis; osteomalacia; new growths; acute and chronic inflammation; changes in the joints after severe labors; spongy condition of the joint due to pregnancy; malpositions; disparity between the diameters of the fetus and pelvis; muscular contractions affecting pelvis.

Huxley(8) reports a case, thirty-six years old, with several previous normal labors. Accidental fall two weeks previous to this labor probable factor. Very little discomfort to patient from this fall. Labor not prolonged, but much pain. Separation third day after labor caused by patient moving in bed. Probably had commenced during labor. No outward rotation of lower limbs, nor were they totally incapable of active movement.

Recovery followed rest on back with a light pelvic binder. Union had taken place between the bones within twelve months after.

The author reported two of the literature cases in which conditions were similar; *i.e.*, healthy pelvic condition, but separation occurring some time after labor owing to abnormal movement of the patient. Skiagram showing separation accompanies this report.

Loescheke (9) investigated whether the pelvis undergoes changes during pregnancy and labor, whether it is a rigid, bony girdle, or to what degree it is capable of dilatation during labor. He finds the constituents of a joint formation and a disposition to relaxation in the pubic symphysis. He considers the question of the degree of pelvic enlargement as well as of a general involvement of the entire osseous system during pregnancy. He claims that the symphysis is normally without cleft. The static relations of the pelvis vary in children and adults and the symphysis of the adult is subjected to a

relative and well-marked increase in pressure greater than that of a child. If clefts appear in the symphysis they are divisible into two varieties, the first of which are the result of a degeneration of the articular disc and appear in adults of both sexes. Traumatic clefts are present only in women who have borne children and are not limited by any anatomical boundaries and result from trauma during labor. The author finds that during labor the symphysis is subject to well-marked stretching and that the increase in the pelvic inlet may amount to several square centimeters. The sacroiliac synchondrosis assumes the rôle of a joint during labor. In every pregnancy a permanent increase of the pelvis results from new growth of the bones. In multipara cases were observed in which the increase at the symphysis was more than 2 centimeters.

The author believes that the growth of the pelvic bones during pregnancy is part of a stimulus which involves the entire osseous system, and results from secretions of the ovaries, thyroid and hypophysis. He gives several statistical tables in support of his views.

Voron et Gounet(10) reports one case, an eighteen-year-old primipara. Forceps extraction. Author insists that this disjunction was due not to the intensity of the traction, but to the unilaterality of the traction on the frontal lake (lac frontal). Patient recovered after three weeks.

In the discussion Bar, the French obstetrician, said that true rupture is very rare. The most usual cause is the application of forceps in a very restricted pelvis, but on an elevated head.

Eastman(11) also quotes the number of cases in literature as about 150. Out of twenty-three cases sixteen were due to forceps delivery. Of Rudaux's ninety-eight cases, twenty-five were spontaneous and the others forceps delivery.

The author discusses the predisposing and proximate causes of rupture.

Reports one case, aged twenty-seven, para-ii. Instant before spontaneous birth snapping noise heard in room. Six weeks later operated on by crescent-shaped incision and suturing of bone with heavy silver wire. Union perfect in thirty-six days.

Brettauer(12) presented a case of fracture of symphysis pubis to New York Obstetrical Society. Aged twenty, married one year. Labor at term, March 8, membranes ruptured twenty-four hours before. March 7, bled freely entire day, weak intermittent pains. On afternoon of March 8 head had been on perineum over two hours and forceps applied. Child easily delivered. Few hours

after delivery patient had severe hemorrhage, uterus packed. Packing removed three days after. Had severe chill. When author saw her, slightly delirious; temperature 104°; pulse 130; legs widely separated, active motion of them impossible. Vulvar region edematous to enormous degree. Bladder distended to its maximum. Slight meteorism; transferred to hospital. Introitus raw, covered with greenish, yellow membrane. Tear in anterior right sulcus reached clitoris leading upward to cavity filled with blood, etc. In this cavity were the fractured ends of the pubic bones; between the bones was a soft nodular mass of prolapsed tissue (urethra and bladder).

Pelvis was strapped with zinc-oxide plaster belt reaching from umbilicus to middle of thigh. Cavity irrigated daily. Catheterized one week, no blood in urine. Edema disappeared in one week. *X*-ray showed fracture of left descending ramus of pubic bone and also a fracture of symphysis to right of the synchondrosis with separation of 2 inches. In spite of straps and belts a diastasis of 1 inch persists. No evidence of fibrous union noted (April 15); seven and one-half weeks after patient permitted to walk; has distinct "waddle."

Minuchin(13) reports one case (out of 18,000 births from 1905 to 1911) in the Basle Women's Hospital.

Woman, twenty-nine, para-ii. First child 1904; second 1910. Entered clinic July 6, 1910, in labor. Spontaneous symphysis rupture found. Child extracted by forceps. Woman had recovered (without complete union of ruptured symphysis) by July 19.

The author criticises points of similarity between other cases quoted in the literature and this one.

He states that the number of cases known in literature is "about 150," but he does not give particulars.

Scheurer(14) reports one case. Primipara twenty-nine years. Forceps extraction. Patient confined March 1, 1908. Immediately after birth condition of the patient (hemorrhage, etc.) caused examination. Symphysis found ruptured. Usual treatment, tight bandages, etc. By March 23 patient had recovered so much that active movement was possible. April 24, patient able to work and without pain. Symphysis fully consolidated. This rupture appears to have been caused by an abnormal development of fetus (weight at birth 4000 gm.). Many cases in literature from same cause. Also the prolonged labor as well as the configuration and degree of solidarity of the skull of fetus.

The most important contributions to literature of the subject, as well as those here given, in recent years are:

Ahlfeld. Die Verletzungen der Beckengelenke während der Geburt und im Wochenbett. *Schmidt's Jahrbücher*, Band clxix, page 187 (1876).

Kayser. Beitrag zur Frage der Symphysenruptur. *Archiv für Gynäkologie*, Band lxx, page 50. Braun V. Fernwald. Neben Symphysenlockerung und Symphysenrupture. *Archiv für Gynäkologie*, Band xlvii, page 104. Mayer, A. Neber die Spontanruptur der Symphyse unter der Geburt (one case). *Beiträge zur Geburtshilfe u. Gyn.*, Band xi, page 200 (1906).

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6. Kayser. *Archiv für Gynäkologie*, 1903, Bd. lxx.

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12. Brettauer. AMER. JOUR. OBST., vol. lxii, 1910, page 468.

13. Minuchin. Ueber die Ruptur der Symphysis ossium pubis unter der Geburt. *Wiener klin. Rundschau.*, vol. xxvi, 1912, page 189.

14. Scheurer, P. Ruptur der Symphyse während der Geburt. *Corresp. Blatt für Scher. Aerzte.*, 1909, vol. xxxix, page 118.

DISCUSSION.

DR. EDWARD J. ILL, Newark, N. J.—It seems to me, this condition, is not as rare as the essayist would lead us to believe, for the reason that within a year I have seen three cases. I saw two that were brought in the hospital on a Sunday morning, and the last one was last June, the patient being the sister of a doctor. They were all caused by high forceps delivery. They all had ruptures of the tissues alongside the bladder. The bladder was separated entirely from the pubic bone, and two of them had vesicovaginal fistula; one had a rupture through into the rectum; three were treated by a method which I have used quite a number of times during my lifetime and my father before me, of putting a broad rubber band around the pelvis, with corset strings in front, which is a clean way of handling the condition, and the bandages can be removed every day cleansed and put back again. These patients very soon regain their ability to walk . I am sure, I must have seen ten cases, and it never occurred to me to speak of them, as I did not know they were so rare. My father told me he had seen a great many of them in his lifetime. I think if we reported all our bad cases, we would have a good many more to report than the few that have been reported. I should think it would be a great mistake to sew the bone up during the acute stage of the illness. These wounds are terrible to behold in their raggedness. I have never seen such wounds, as one sees under these circumstances. While I have never seen a case so bad that it needed suture of the pubic bone afterward, I should think, if I had such a case, I would want to do it if the separation could not be closed otherwise. Some years ago we saw a late case in which the separation was an inch, and the union was so good that the woman had very little difficulty in walking.

DR. ASA B. DAVIS, New York City.—I wish to say that I know of five cases which have not been reported. One case happened in my own experience and one in the practice of a private physician, and Dr. Morgan, of our staff, has histories of three cases. In our experience, they are rare complications in the Lying-In Hospital service. We have had something between 80,000 and 90,000 deliveries, and I have known of but two that have occurred in that number in which there was rupture of the symphysis pubis.

The case I speak of was that of a physician's wife. This was fifteen or more years ago. There were three of us in attendance. The head had partly engaged and labor had ceased to progress. I tried forceps which were still in place, and the younger man, who was well trained as an obstetrician and who now holds an important position as a surgeon, began attempts at delivery. As my back was turned to the case, I heard a distinct report and on examination I found a rupture on the right side up through the vestibule. The soft tissue was torn away from the bone and there was separation at the symphysis. There were sockets and spurs in the joint, clean cut, so that they could be seen distinctly. That woman made a slow recovery. She had difficulty in urinating for a time so that

it was necessary to use the catheter. She was treated, first, by adhesive strips, and then with a belt with buckles, and later the difficulty in walking was pronounced in her case. For a time she was unable to walk, and then in about three or four months she could walk with increasing ease if she walked on a level floor. The moment she began to move up an incline or to go upstairs she would have great difficulty. She finally recovered completely and has since given birth to children without trouble.

DR. ABRAHAM J. RONGY, New York City.—I do not think separation of the symphysis or fracture of the pubic bone is so rare as we have been lead to believe. I know of four cases in the obstetrical service of Lebanon Hospital. In two there was spontaneous separation of the pubic arch. In one the pubic bone was separated by the after-coming head. In the fourth case, the pubic bone was fractured during the high forceps delivery. In this case the urethra was torn away from the bladder.

Two of these patients were Italian women and I suggested at the time whether the question of rickets did not have any bearing on the cases. It is well known that a great number of women are rachitic and it is a question whether the bones of the pelvis remain as strong in these patients. Separation of the symphysis usually takes place when the head is not properly engaged and in patients who have a contracted outlet and in whom the anterior segment of the pelvic outlet is shortened. In two of these cases, I found the arch of the outlet typically flat and narrow and therefore the diameter of the head and pelvis were out of proportion, and when the head wedges itself crosswise, some separation is likely to occur.

In regard to the treatment in cases of spontaneous separation, very little treatment is necessary except rest in bed and a small strip of adhesive plaster around the pelvis. In the case of fracture of the pubic bone, we had a good deal of trouble on account of the mass of tissue that placed itself between the ends of the bone. However, surgical separation of the pubic bone, like in cases of pubiotomy, give very little trouble and the patient is kept in bed not longer than fourteen or fifteen days. The longest time I have kept a patient in bed, after performing a pubiotomy, was twenty-one days, and I have performed nine pubiotomies. I do not think these patients have much trouble in walking because the pressure and weight of the body does not fall on the pubic bones. The pressure is along the spinal column.

THREE CASES.

BY

ASA B. DAVIS, M. D.,

New York.

I. INTERMITTENT AND UNILATERAL CHYLURIA.

MRS. M. G., native of Gibraltar, Spain, aged twenty-eight, para-iii, was admitted to the Lying-In Hospital, December 12, 1912, in the eighth month of her third normal pregnancy, suffering from a double lobar pneumonia, which showed the characteristic physical signs, and the high temperature, pulse and respiration, usual in that condition. Two days later convalescence began by crisis. The physical signs and temperature, pulse and respiration quickly became normal, and continued thus until her discharge, January 12, 1913. Pregnancy continued, and was in no appreciable way modified. Shortly before her discharge from the hospital it was noticed that she was passing turbid urine, slightly stained with blood. This urine proved to be chylous. She was readmitted to the hospital, February 6, 1913, to await her confinement, which took place February 18, 1913. It was without noteworthy incident. The child was well developed and lived. The patient's general health was excellent. She remained in the hospital for observation until March 19, 1913, when she was discharged with her child, in good condition. During this entire stay in the hospital, she continued to pass this chylous urine, the examination of which before delivery, showed acid reaction, specific gravity, 1020, albumin present, much fat, many blood cells, and no casts. A search for filaria sanguineous was made from specimens of blood taken at night, without result.

Cystoscopic examination by Dr. H. G. Bugbee showed the urethra, bladder and ureteral orifices normal; clear urine from the right ureter; normal cloudy urine from the left ureter. Ureters normal in length and caliber. Normal urine and function of the right kidney. Diminished function and chylous urine from the left kidney. Collargol injection of kidney pelves and ureters shows in x-ray picture normal outline.

The reports in full of specimens of urine, examined by Dr. Frederic E. Sondern, are as follows:

Separately Collected from Right Kidney.

Volume, 9 c.c.	Analysis reported, March 17, 1913.
Reaction, acid.	Color, amber.
Sediment, very moderate.	Odor, not offensive.
Nature of the sediment, heavy.	Specific gravity, 1024.
Albumin, heat and acid test, very faint trace.	Sugar cupric test, negative.
Amount Esbach per mile test: Same by weight.	Chlorides, 0.8 per cent. by weight.
Urea, 2.8 per cent. by weight.	Freezing-point, minus .....° C.
Additional tests, none.	

Examination of Sediment.

Blood, small amount.
Pus, none.
Mucus, none.
Casts, none found.
Bacteria, no apparent bacteriuria.
Epithelium, numerous round cells probably from the ureter.
Crystalline and amorphous matter, none.
Other structures, none.

Separately Collected from Left Kidney.

Volume, 10 c.c.	Analysis reported, March 17, 1913.
Reaction, acid.	Color, chylous.
Sediment, moderate.	Odor, not offensive.
Nature of the sediment, heavy.	Specific gravity, 1015.
Albumin, heat and acid test, present.	Sugar cupric test, negative.
Amount Esbach test, 2 1/2 per mile by weight.	Chlorides, 0.5 per cent. by weight.
Urea, 1.53 per cent. by weight.	Freezing-point, minus .....° C.
Additional tests, none.	

Examination of Sediment.

Blood, moderate amount.
Pus, none.
Mucus, none.
Casts, none found.
Bacteria, no apparent bacteriuria.
Epithelium, numerous round cells probably from the ureter.
Crystalline and amorphous matter, none.
Other structures, decided amorphous granular deposit.

Summary.—Specimen from the *right kidney:* The very faint trace of albumin seems fully accounted for by the blood cells, and no evidences of a lesion of the pelvis or parenchyma could be found.

Specimen from the *left kidney:* While the entire emulsion could not be separated with ether, this is not uncommon in specimens of chyluria. Aside from its chylous nature, the specimen contains much more albumin than the blood would account for, but no microscopic evidences of a lesion of the pelvis or parenchyma could be found. A permeability of the kidney of chyle and albumin has been reported, without the presence of filaria in either the blood or urine. Cases of unilateral chyluria have been reported by Israel (*Mitt. a. d. Grenzgeb. d. Med. und Chir.*, ii, 171, 217, 1903), Salle (*Deut. med. Woch.*, xxxv, 142, 1909) and others.

The specimens collected for phenolsulphonephthalein functional test show the following figures based on supposition that 0.006 gm. of the dye was injected.

Right kidney: First hour, 0.0015 dye—25 per cent.
Left kidney: First hour, 0.0007 dye—12 per cent.

Separately Collected from Right Kidney.

Volume, 19 c.c.
Reaction, acid.
Sediment, moderate.
Nature of the sediment, heavy.
Albumin, heat and acid test, faint trace.
Amount Esbach test, same per mile by weight.
Urea, 1.63 per cent. by weight.
Additional tests, none.

Analysis reported, April 15, 1913.
Color, pale amber.
Odor, not offensive.
Specific gravity, 1018.
Sugar cupric test, negative.
Chlorides, 0.8 per cent. by weight.
Freezing-point, minus.....° C.

Examination of Sediment.

Blood, small amount.
Pus, none
Mucus, none.
Casts, none found.
Bacteria, no apparent bacteriuria. No tubercle bacilli found.
Epithelium, numerous round cells probably from the ureter.
Crystalline and amorphous matter, none.
Other structures, none.

Separately Collected from Left Kidney.

Volume, 22 c.c.
Reaction, acid.
Sediment, moderate.
Nature of the sediment, heavy.
Albumin, heat and acid test, faint trace.
Amount Esbach test, same per mile by weight.
Urea, 1.56 per cent. by weight.
Additional tests, none.

Analysis reported, April 15, 1913.
Color, pale amber.
Odor, not offensive.
Specific gravity, 1017.
Sugar cupric test, negative.
Chlorides, 0.8 per cent. by weight.
Freezing-point, minus..... ° C.

Examination of Sediment.

Blood, small amount.
Pus, none.
Mucus, none.
Casts, very few hyaline casts.
Bacteria, no apparent bacteriuria. No tubercle bacilli found.
Epithelium, numerous round cells probably from the ureter.
Crystalline and amorphous matter, none.
Other structures, none.

Bladder Specimen.

Reaction, acid.
Sediment, very moderate.
Nature of the sediment, heavy.
Albumin, heat and acid test, faint trace.
Nitromagnesium test, faint trace.
Amount Esbach test, same per mile by weight.
Bile pigment, absent.
Urea, 1.29 per cent. by weight.
Indican, no excess.

Analysis reported, April 15, 1913.
Color, light amber.
Odor, not offensive.
Specific gravity, 1014.
Sugar cupric test, negative. Bismuth test, negative.
Acetone, absent.
Chlorides, 0.6 per cent. by weight.
Phosphates, no excess.

Examination of Sediment.

Blood, none.
Pus, none.
Mucus, small amount.
Casts, few hyaline casts.
Bacteria, no apparent bacteriuria.
Epithelium, some bladder cells.
Crystalline and amorphous matter, none.
Other structures, none.

Summary.—Specimen from *right kidney:* The faint trace of albumin seems fully accounted for by the blood cells and no evidences of a lesion of the pelvis or parenchyma could be found.

Specimen from *left kidney*: This specimen also shows no more albumin than the blood would seem to account for, but very few hyaline casts are present with practically the same amount of urine, specific gravity and amount of urea noted in the specimen from the other kidney. Chyle could not be demonstrated.

The specimens collected for the phenolsulphonephthalein functional test show the following figures based on supposition that 0.006 gm. of the dye was injected.

Right kidney: First hour, 18 per cent. dye.

Left kidney: First hour, 20 per cent. dye.

The *bladder specimen* shows nothing noteworthy in addition to the above.

The patient states that she first noticed the change in her urine at about her fifteenth year, near the time of her first menstruation—that it was not constant in its appearance. The chylous condition would be absent for years at a time, but would reappear after any indulgence in anger or emotion. Palpation has never revealed tenderness or enlargement of the left kidney. The chyluria was absent for several years, but reappeared at the death of her mother ten years ago, and was present for several months. It was present during the entire time of her first pregnancy, and for nine months thereafter. During and after her second pregnancy, it was absent. There has been no noticeable difference in the character of the night and the day urine. Now, September 13, 1913, there is a report that the urine has been clear for five days, and that the general health is good. She is nursing her infant.

D. V. Salle, in *Deutsche medizinische Wochenschrift*, No. 4, Jahrg. 35, p. 142, Berlin, 1909, discusses chyluria, which is a common disease in the tropics, but very rare in Europe. He maintains that the tropical form always depends upon the presence of the parasite, filaria sanguineous, while the presence of this parasite has

never been proven in any European case. It is characterized by enlargement and obstruction of the lymph vessels, forming abnormal communications between the lymph and chylous vessels. In the tropical countries the circulation of chyle is changed, and it is partly discharged directly to the urinary organs by the lymph vessels. He reports the case of a male, twenty-five, recently returned from Africa, in whom no filaria were found—pain on pressure, in the region of the left kidney—noticeable palpitation. The quantity of fat in the urine varies considerably, sometimes disappearing entirely, and is invariably much greater after rest than after motion. As a rule, the urine is clear in the daytime, except when the patient is forced to rest in a sitting position, and milky at night and in the morning. It is found that fat is secreted by the left kidney only.

He concludes that the cause of the disease is either chylous blood and abnormal metabolism, or a change in the renal function, and, further, that chyle is discharged by anatomical lesions either through the thoracic duct to the lymph vessels of the left side urinary organs, or direct to the pelvis of the kidney or ureter.

Ernest R. Frank (*Wiener med. Wochenschrift*, July 1, 1909) reports a case of European chyluria in a male, forty years of age. Milky urine in the morning only, and the chylous urine comes from the right ureter only. He concludes that there must be a communication between the chylous vessels and the urinary passage.

J. Huatek (*Deutsche med. Wochenschrift*, Bd. xxxvi, No. 17, 1910, p. 794) reports a case of chyluria in a married woman, thirty-five years old, and says that the left kidney secretes four times as much fat as the right. No parasites were found in his case.

J. Veis (*Berl. klinischer Wochenschrift*, Bd. xl, No. 27, 1905) describes a case in which chyluria was noticeable during pregnancy. Pregnancy was forcibly interrupted, rather because of an excessive albuminuria, than because of the chyluria.

II. MYOMECTOMY AT THE EIGHTH WEEK, PREGNANCY NOT INTERRUPTED; NORMAL DELIVERY AT TERM.

Mrs. X. consulted me early in August, 1912, giving the following history: Native of U. S., aged thirty, married, para-i. Menstruation began the fifteenth year, twenty-eight-day type, always scant and painful. Intervals somewhat shorter between the periods during the past three years. The last menstruation was July 12, 1912. She was exhibiting the usual symptoms of early pregnancy. No

examination was made at this time. There was nothing noteworthy found by urine analysis, and the general health was good.

September 4, 1912, she again appeared for advice, and was evidently quite ill. This was in the eighth week from her last menstruation. She stated that on Aug. 29, 1912, she began to have pains in the lower lumbar and sacral regions, and, at first, a slight discharge of blood from the vagina. Sometimes considerable pieces of clotted blood passed. There would be periods of twenty-four hours when she would be practically free from pain and only slight blood-stained discharge. Then the symptoms would recur. This condition had continued up to the time of her visit. She had noticed a tender mass just above the symphysis. Ectopic pregnancy was thought to be the condition most probably existing. No examination was made, but she was sent at once to the Private Pavilion of the Lying-In Hospital, where any emergency could be met. There it was found that there was a large, hard, round tumor, the size of a fetal head, in the posterior and upper part of the pelvis, which crowded the cervix up back of the symphysis, and the remainder of the pregnant uterus was in the midline above the symphysis, and was the tender mass which the patient had already palpated.

She was prepared for operation to take place the following morning, when the abdomen was opened in the lower midline, and the uterus, with tumor attached, were lifted out and turned forward. The tumor was found to take its origin from the lower part of the posterior wall of the uterus, a little to the left of the median line and below the fundus. It was almost entirely outside of the uterine wall, being attached to it for about an inch and a half, without a pedicle, but it extended into the uterine wall about two-thirds of the thickness of the uterus at that point. It was carefully dissected away and the wound was closed with a few interrupted chromic gut sutures, and these were buried by a continuous Cushing stitch suture.

The uterus was evidently pregnant about eight weeks. It was replaced in the pelvis, and the abdomen was closed in three layers.

Recovery was without rise of temperature. There was no more pain or vaginal bleeding. The wounds closed by primary union and the patient was discharged from the hospital on September 21, 1912, still pregnant and in good condition.

Her pregnancy was uneventful thereafter, save for slight bleeding during November 2 and 3, and she was confined in another city after a normal labor, April 27, 1913.

The pathologist reports: Tumor generally rounded, lobulated

and measures 12×7×7 cm. Hard, made up of cellular, fibrous tissue. There are certain areas throughout tumor which show some necrosis. No evidence of malignancy.

Diagnosis.—Myofibroma.

III. ACUTE DILATATION OF THE STOMACH FOLLOWING VENTRAL FIXATION OF THE UTERUS; LONG LABOR; LOW FORCEPS DELIVERY; RECOVERY.

M. R., Russian, aged thirty-four, para-i, married, was admitted to the wards of the Second Division of the Lying-In Hospital, at 3 A. M., December 21, 1912, stating that she had been in active labor since six o'clock the night before. Her last menstruation was in April, 1912. She was evidently at full term. Her abdomen was very large and pendulous, and there was a broad cicatrix, extending from the umbilicus to the pubes. It was learned from the histories of another hospital that she had undergone the following operations there in April, 1908: Dilatation and curettage, myomectomy and appendectomy.

It was found upon examination that the vertex was L. O. A., partly engaged at the brim of a large pelvis. Fetal heart 128, left and below. Uterine contractions forcible every five minutes. The cervix was three fingers dilated and the membranes ruptured. Active labor continued until 5 P. M., twenty-three hours from its onset, before cervical dilatation was complete. Then the vertex quickly descended to the perineum, where it remained until 8.30 P. M., and the soft tissues at the vulva outlet become very edematous. She was then delivered by low forceps operation. The edematous perineum was lacerated down to the muscles and was repaired with three silkworm-gut sutures. The child weighed 3900 gm. It was well developed, it lived and was nursed by its mother.

The patient showed marked exhaustion. On the following day the abdomen began to distend, particularly in the region of the stomach, and she vomited a small quantity of brown fluid. An enema, which was given, was effectual in removing gas and feces. Her temperature was 101.6°, pulse 120, and respiration 28. Her distress was marked and increasing. She had the appearance of a very ill woman. On the following morning, Dec. 23, 1912, the distention had increased. The whole abdomen was tense and the outline of the greatly distended stomach was visible with its lower border extending to the umbilicus. Lavage brought away about a quart of brown fluid and much gas, giving the patient noticeable

relief. An ice-coil was placed on the abdomen. Lavage was repeated four hours later, resulting in progressive improvement. On the third day postpartum lavage was found to be necessary but twice. She was given strychnine sulph., gr. 1/30, three times a day. Her temperature remained between 101.5° and 102°, pulse 120, and respiration 26 to 28 until noon of the fourth day, when these were as follows: temperature 99°, pulse 95, respiration 24. Daily lavage was continued until the ninth day. This brought away undigested food and glairy mucus, indicating slow digestive processes. She was transferred to the solarium on her fourteenth day, and discharged from the hospital on her twenty-eighth day postpartum, in good condition.

The operations which this patient underwent in 1908 probably resulted in ventral suspension of the uterus.

It is noticeable that pregnant women who have had ventral suspension, either are unable to dilate the cervix at all, or it is, in most cases, a very long, tedious process. The first stage of labor is unduly prolonged. And we have found the results of some form of uterine suspension the main indication for Cesarean section in nine cases.

DISCUSSION.

DR. MAURICE I. ROSENTHAL, Fort Wayne, Indiana.—In connection with the report of Dr. Davis, I may add two cases of pregnancy complicated by tumor. One was a Mrs. W., second pregnancy, who was about thirty-four years of age. She was referred to the hospital as a case of ectopic gestation. The history given is as follows: Her last menstruation had been somewhat scanty, and she had missed her menstrual periods twice since. During the day she was taken with pain in the pelvis and later developed some hemorrhage. Examination revealed a pregnant uterus between the third and fourth month, with a tumor occupying the left posterior aspect of the uterus. A diagnosis of threatened abortion due to pressure of a fibroid tumor was made. Laparotomy was done, and a tumor the size of an orange was enucleated from the posterior left lateral aspect of the uterus, situated low down, extending well into the muscularis of the uterus. The wound was sutured, and she made an uneventful recovery, and was delivered of a living boy at term.

Another case was one of pregnancy complicated by an unusually large intraligamentous cyst. The woman was brought into the hospital with a diagnosis of pregnancy near term, and gave a history of having missed menstruation about four times. This intraligamentous tumor was unusually large and was removed in the usual manner. The patient went on to uneventful recovery, is now near

term but has not yet been delivered. She is a primipara, twenty-five years of age.

DR. CHARLES E. RUTH, Des Moines, Iowa.—I have had no experience with chyluria in this country, but came considerably in contact with it in Porto Rico, where I saw it periodically and sometimes very persistently, associated not only with pregnancy, but independent of it, in individuals practically of all ages. Where pure chyluria exists in this country, I would feel that a very careful examination should be made with reference to the possibilities of filaria as the cause.

I have done but three abdominal operations for tumors complicating pregnancy. One of them was a myomectomy. All of them were satisfactory in so far that the patients recovered and pregnancy went on undisturbed.

The last case that Dr. Davis reported interested me more than any of the others, because I am satisfied that this subject of acute dilatation of the stomach is as important as any topic that can be brought before this association.

I prepared a paper on this subject last year, but was unable to be present at the meeting to read it, and naturally I am interested in the subject. I believe it should interest the general practitioner quite as much as the surgeon, the obstetrician and gynecologist. A particularly important point that I want to bring out in my part of the discussion is, that as physicians and surgeons, in our relation with the various hospital services and the training of nurses, we should be very insistent and persistent in our routine examination of the condition of the upper abdomen in all severe illnesses and after all operations, abdominal particularly, and after all obstetric cases, to note the *first indication*, not the late manifestations when the stomach is greatly distended and the patient is erucatating black grumous material, and when the pulse is greatly weakened and prostration is extreme. By acting promptly we will save the lives of many if we slip our hands under the covers and note any distention of the abdomen. Immediately pass a stomach tube when there is any marked distress or eructation of gas, and train the nurse to make these observations during the day and night. By so doing we will prevent our patients passing into *extremis* with a terrific struggle to save life. The stomach tube offers the only practical relief in these cases, and in its proper early use we will avoid the chagrin of these cases being allowed to go to the verge of the grave. In other words, we must prevent the complete permanent paralysis of overdistention.

DR. HERMAN E. HAYD, Buffalo, New York.—I feel that the surgeon and physician are worrying themselves altogether too much as to the necessity for surgical intervention for fibroid tumors, complicating pregnancy. It is surprising to see how large a tumor can be, and how fast it grows, and yet offer no obstruction whatever to the future delivery of the child, and unless the tumor is located in the cervix, or away down in the lower uterine segment or extending outward into the broad ligament, I do not believe that we are

justified in doing any operation when a woman is pregnant, on account of the possibilities of prospective danger in her delivery, and that was brought particularly to my mind only a few weeks ago when I operated on a woman who was delivered four months before of a dead baby. She had a fibroid in her uterus that was as large as a turnip. There was no difficulty whatsoever in the delivery of the child.

Again, it is surprising to see what an amount of manipulation and what an amount of injury the pregnant uterus will permit when we do operate where the condition is not associated with any septic process. We can remove large tumors from the uterus, and yet pregnancy will be in no way interfered with, and we also know how little we can manipulate if the woman has typhoid fever or has a suppurative appendicitis. We operate on these cases of appendicitis and they abort or we attend a woman with typhoid fever and she will abort with the most trivial operative intervention.

I had an experience which I reported to the Association of a woman who had a large fibroid tumor growing in the upper zone of the uterus that was injured by the kick of her husband. He came home one day drunk and kicked her, so that there was marked discoloration in the right side when I saw her five days after the injury. There was a large mass in the right side which, at first, gave me the impression that it was appendicitis. She had a temperature of 99.5°, and as the swelling was excruciatingly tender, and the woman seven months pregnant, I advised an operation. After opening the abdomen over the swelling, over the ordinary appendiceal site, I delivered a tumor larger than my fist, which was attached by a small pedicle not larger than my thumb; it was smooth, without adhesions; it did not show any particular evidence on the surface of any injury, and I felt very much chagrined to think I had subjected this woman to an operation when she would have delivered herself without any difficulty but on account of the extreme tenderness and the history of the injury, and the slight temperature, I made up my mind the case was a suppurating fibroid and should be operated. On delivering the tumor there were no evidences of suppuration upon the surface, but before closing the abdomen I said to the nurse, open the tumor, and in the center was a teaspoonful of pus, so the indications of the operation were self-evident.

An interesting feature in connection with the case was the difficulty I had in stopping hemorrhage. I separated the peritoneum from the pedicle, tied it off carefully and then sewed over with a dull needle, but where the needle punctured the uterus there was oozing and so profuse that I was afraid to close the wound, and finally in my desperation I said to the husband who was in the anteroom that I was afraid to close the wound up unless I applied a forceps and in doing that I realized I perhaps would provoke a premature delivery. Nevertheless, I applied a bent ligament clamp to the pedicle, left it on for twenty-four hours, removed it the next day, the woman went on and delivered herself of a 14-pound baby, seven weeks afterward.

I saw this woman a few weeks ago. The baby is a beautiful boy,

now thirteen months old, so it is possible for one to do all kinds of work on a pregnant uterus and yet in view of that possibility, I am sure we are operating altogether too often, because the difficulties for future delivery in most cases are very, very slight. A tumor even of large size lifts itself up and it often grows rapidly. That we know to be the case particularly with a myoma, not only from the increased growth of the muscle tissue, but also from so much associated edema. Nevertheless, very seldom, unless the tumor is in the cervix, away down in the lower segment of the uterus, does it offer any obstacle to delivery.

DR. GORDON K. DICKINSON, Jersey City, N. J.—There are two points that interest me in these papers. One is a fact not generally known and brought out by Leaf of England, namely, that there is a perfect anastomosis between the veins and the lymphatics. The lymphatics do not run independently to the major trunks and then into the veins, but anastomose here and there through the body, there being a perfect intercommunication. This may also account for the entrance of chyle from the receptaculum chyli into the renal vein.

The description of dilatation of the stomach interests me because we occasionally see it. It is very tragic. When we do meet it, we must be prompt in passing our hands under the bedclothes and feeling the epigastrium. Of course, we have conditions which simulate dilatation of the stomach and are more dangerous and toxic, which do not elevate the epigastrium, a dilated duodenum, for instance, and I have seen a number of such cases. In these cases you must act promptly and quickly to relieve the constriction of the duodenum at its lower third as it passes under the artery.

In these cases I have been in the habit of adding to the lavage of the stomach elevation of the foot of the bed. It is wonderful how homeopathic internes are when you tell them to elevate the foot of the bed. They will elevate it a foot or so. You really want an exaggerated Trendelenburg position, putting the head low and the feet high until you have unlocked the duodenum, until there is a perfect collapse of it by position and lavage, and then you will obtain some success.

DR. HUGO O. PANTZER, Indianapolis, Indiana.—I wish to speak in emphasis of the position taken by Dr. Hayd. I have had fourteen cases where the waiting policy was pursued in cases of pregnancy complicated by tumors, and all passed to full term and safe delivery except one. In this case, a primipara, there was a fibroid which subsequently necrosed during childbed. The ineffectual attempts of the uterus to expel this mass called for operative interference; the vaginal removal being accomplished with recovery of the patient. The intramural location of this tumor precluded a conservative operation during pregnancy. Had this been attempted it would have ended in an hysterectomy. This patient has had another child since!

DR. DAVIS (closing the discussion).—I would like to bring out in this particular case of myomectomy the report of the pathologist.

He states that all through this tumor there were necrotic areas, and my own report was that the patient was very ill. She was evidently more ill than could be accounted for by pressure of this tumor upon the growing uterus. In her case I think she would have had an abortion. She might have overcome the necrosis if the abortion had taken place, but it seemed to us that it was necessary to operate in this particular case and remove the fibroid tumor.

Within the last month I have watched a patient through to term who had a pelvis full of fibroid tumors. There was also one up on the left side near the fundus as large as an orange, and those in the pelvis were so large and filled the pelvis so full that a funnel-like opening for the rectum was about all the passage there was through the pelvis. She was delivered by Cesarean section and made a good recovery. We do not remove fibroids at the time of Cesarean section. We consider the operation of delivery is sufficient for mother and child. At some subsequent convenient time we remove the fibroids if that is necessary. The edema goes down and the vascularity and the size of the tumor is much diminished, and we wait for that.

It is of interest in this case to notice that she did not become pregnant for fifteen years. She had one child fifteen years ago, but not another pregnancy until the present one. What happened there is undoubtedly this: after the delivery of the first child, the fibroids grew in such a way that they closed the cervical canal; they continued growing until they reached a size sufficient to open the cervical canal and allow conception to take place.

DR. MAURICE I. ROSENTHAL, Fort Wayne, Indiana.—In my previous remarks, if I did not say, I intended to say that the tumor was situated in the lower left portion of the uterus, and by reason of its pressure was bringing about abortion, and was in such a position that it would have been obstructive to labor and for these reasons it was enucleated.

CONSERVATISM IN OPERATIONS FOR ACUTE INFLAMMATORY PELVIC DISEASE.

BY
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THE word "acute" in the title is not intended to mean the very early days of pelvic infection, but rather that stage in the progress of the disease when the constitutional symptoms are beginning to subside, as will be brought out later.

Much has been written about conservative operations on the tubes and ovaries when they are the subject of chronic affections. They have been resected, and the uterine and ovarian ends rendered patulous when closed by inflammation.

Ovaries have been subjected to various procedures, when the seat of chronic disease, designed to preserve or restore their function. There has been little said, however, about attempted conservation of structures the subject of acute, and apparently much greater or more extensive pathology.

It is the purpose of this effort to point out the possibility of structures, which have heretofore been considered hopelessly destroyed by inflammation, returning to a state wherein normal function is probable.

We have all seen patients with acute salpingitis presenting a palpable mass on one or both sides of the pelvis who refused operation and recovered sufficiently to bear children. Yet we have all been guilty of removing both tubes and leaving but a very small piece of ovarian tissue in cases where the trouble evidently began on one side and the other became involved only secondarily. Or, as in a case which occurred in my practice a number of years ago, an appendiceal abscess was opened and drained in a young girl, fourteen years of age. The drainage tract was allowed to close too soon and a year later a large abscess was discovered in the pelvis. It was opened by a median incision. After the pus was evacuated, the ovaries and tubes were found so matted together that it seemed imperative to take them out. The tubes were much enlarged; their walls were infiltrated, edematous and friable. They were only affected secondarily, however, and not the mucous lining. Were I to operate that particular

case to-day I certainly would not remove both tubes and ovaries. Experience has taught me better.

It must be remembered that structures the seat of acute inflammations tend to more or less complete recovery. The edema disappears, the discharge lessens and finally ceases, and it is not every case that is left with the lumen of the tube strictured and occluded. Even in case they are so left, after the subsidence of the inflammation they may be inoffensive and symptomless. Ovaries which are found surrounded by exudate and adhesions may be liberated, the adhesions wiped off, retention cysts evacuated and the ovary allowed to remain. Many of these will subsequently prove themselves capable of discharging ova.

There seems to be a difference of opinion and practice among gynecologists in the method of handling these cases.

I. S. Stone (*J. A. M. A.*, March 1, 1913), in an article on "The Conservative Treatment of Salpingitis by Uterine Injection," says he has forcibly injected a 25 per cent. alcoholic solution of tincture of iodine into the uterus, forcing some of the solution out through the tubes in most cases. This injection is immediately followed by laparotomy. The iodine solution is seen in the culdesac. If the tube is to be saved, the same solution is forcibly injected down the tube toward the uterus. Two pregnancies are reported as following this procedure. No shock or other ill effect is said to follow.

Lörincz (*Gyogyaszat*, liii, 40) uses a 2 per cent. solution of argentamine injected into the cavity of the uterus. He keeps the patient in bed five or six weeks, and uses twenty-five to forty injections. If not cured by that time he operates. He reports good results from this method.

Edward Reynolds of Boston (*Surg. Gyn. and Obst.*, vol. viv, p. 255), says: "It seems to me that we should, however, make a sharp distinction between the conservation of parts of diseased tubes and similar conservation of the ovaries. In my experience, the two operations are of different values. Though the conservation of the tubes is a field worth cultivating, I am not yet able to feel that the prospect of obtaining functional activity in tubes which have been once inflamed is any too good; on the other hand, my experience leads me to believe that the prognosis for obtaining an absence of symptomatology and a restoration of the enlarged ovaries is extremely good."

Montgomery's Gynecology, 383, says that "conservative treatment may consist in breaking up adhesions; reopening the orifice of the tube; salpingostomy; or partial resection of the tube itself,

thus shortening it and permitting the removal of such portions as are prejudicial to health." This evidently applies to old cases.

On the other hand, note the ultraconservative statements of Ashton, Practice of Gynecology, p. 513. "The conservative modern treatment of infections, involving the uterine appendages and the pelvic structures, is a marked advance in the surgery of the female pelvis. The former practice of early operative interference in these cases not only was attended by a high mortality, but was also responsible for the unnecessary sacrifice of the organs of procreation. The treatment is based upon the following facts:

"That many patients recover their health and the pelvic organs are spontaneously restored to a normal condition without the aid of operative measures.

"That an operation during the acute stages of a pelvic inflammation is attended by a high mortality and the sacrifice of organs that might otherwise be saved. Many women recover their health and the pelvic organs resume their normal functions without an operation. A number of women who have had gonorrheal or septic inflammation of the uterine adnexa have recovered spontaneously and borne children. The question of recovery depends upon the amount of damage done to the tubal mucosa and ovaries and to the extent and character of the parietal and visceral adhesions."

Ashton also says that even in the presence of gross lesions, as tubal or tuboovarian abscess, recovery has occurred, and he adds that this is especially true in septic infections which cause but little injury to the tubal mucosa, and very large pelvic exudates have been known to disappear in time without the aid of surgery.

It is rather between these extremes that I find myself at this time. I do not recommend early operation in any pelvic infection. The danger is greater than if the body is allowed time to deal with the invading germ by establishing its own protecting mechanism.

On the other hand, one should not allow a large pelvic exudate or a tuboovarian abscess to remain until absorbed. That means chronic invalidism. Pus should be evacuated as soon as it is safe to do so. But when once inside the abdomen for this purpose it is wrong to think that all pathology present must be removed by the knife. Ample provision for drainage and the ablation of the original focus will be sufficient and save many a tube and ovary which will result in much greater peace and happiness to the patient.

The following cases were instrumental in bringing me to my present convictions.

Mrs. B. W., referred by Dr. O. P. Franks of Churubusco, is a young

woman, twenty-two years of age, who was always well as a girl. She was delivered of her first child January 16, 1913, after a normal labor. On the 23d, she began to have fever and in a few days received an injection of phylacogens (mixed). The reaction developed promptly, but the expected improvement did not appear. Her temperature frequently reached 103° and 104° F. Her pulse rose rapidly and continued high. The phylacogens were twice repeated with similar discouraging results and she was brought to the Lutheran Hospital on March 14 with a leukocytosis of 17,300 of which 86 percent. were polynuclears. A tender mass was present in the right fornix, and the abdomen was distended. She was markedly septic. On opening the abdomen the omentum was found adherent to the anterior pelvic wall on the right side. When it was liberated several ounces of pus escaped. The thickened omental mass was removed. This uncovered the uterus, a process of which was found adherent to the anterior pelvic wall on the right side above the bladder. A true diverticulum had been produced resembling the case reported before this association last year, save that the apex of the cone-shaped diverticulum was adherent to the right anterior wall of the pelvis instead of the cecum and appendix. The right tube was very much infiltrated and thickened. It seemed to leave the body of the uterus on its posterior surface, owing to the distortion produced by the adherent diverticulum. When the uterus was freed a large granulating surface was revealed on the pelvic wall and uterus. Owing to her desperate condition at the time no attempt was made to remove the uterus or tube, but a large gauze pack was introduced. She rallied and made a good recovery, no further operation becoming necessary.

Contrary to the case of diverticulum reported last year, which began in the sixth month of uterogestation in adhesions due to an appendicitis, this case did not develop until a week following delivery. The uterus at this time is large and soft. Pus escaping from the right tube might easily be responsible for the pathology present.

The value of conservatism in this case is apparent. A more prolonged or severe operation would have killed the patient. Then, too, without the removal of structures which seemed irrevocably lost by disease, she remains at this time symptomatically well.

Mrs. F. K., thirty-one years of age, referred by Dr. G. M. Brattain of Antwerp, O. Nothing of importance in the family history. She is the mother of three children, the youngest being five years of age. She has had several self-induced miscarriages from which

she thought she had made a satisfactory recovery. The regular menstrual period appeared on July 4 and continued the usual time. A flow reappeared on the 14th, although she did not consider herself pregnant and had not interfered with the uterus. The flow was profuse. After a few days a chill occurred, followed by fever and abdominal tenderness. The pulse and temperature were high and the abdomen distended. On admission the pulse was 96 and temperature 100° F.

Abdomen universally tympanitic. Tenderness more marked in the right flank. On opening the belly a large abscess was evacuated originating from the left tube. The tube and ovary were finally removed *en masse*. The right tube was much enlarged and adherent to the under surface of the broad ligament. The right ovary was also delivered from a mass of adhesions. These organs had formed part of the wall of the abscess cavity. As they bore no evidence of disease of the mucosa, but were only involved secondarily, they were allowed to remain.

Large gauze drains were inserted, one going to the culdesac, one in front of the broad ligament on the left side, and one to the right tube and ovary.

Up to this time her progress has been perfectly satisfactory, fully as much so as if we had deprived her of the right ovary and tube.

DISCUSSION.

DR. DOUGLAS C. MORIARTA, Saratoga Springs, N. Y.—This subject is a very important one, and as I listened to the paper the first thought that occurred to me was, what *is* conservative surgery in the pelvis for acute infections. First, I think it is very important to make a differential diagnosis of the condition, and surely we must differentiate between an exudate and tubal infection or ovarian abscess; and I believe that in a case of acute infection it is not wise to open the abdomen. I think if we open from below and drain, we conserve the tissues, and if it is an exudate, we are very much better off than to open from above. If it is a tubal infection, we can still open from below, drain, and so conserve the tissues; later of course we must do a secondary operation, for draining, as you all know, never cures a pyosalpinx. In these pelvic infections we apparently have forgotten the work of Pryor, who opened these cases from below, used iodoform and drained. To reiterate, the operation from above in acute inflammatory disease, in my judgment, is seldom indicated, and is always an operation of high mortality.

DR. GORDON K. DICKINSON, Jersey City, N. J.—Conservatism is

a game that I have been trying for some years, and I will say that the majority of women do not thank you for it. In the inflammatory conditions we meet, whether due to the streptococcus or gonococcus, you can open the abdomen; you can go in below or above; you can open the tubes and inject them with tincture of iodine or with what other antiseptics you wish; you can clean things up, but you have left a condition as you find in appendicitis, to which Deaver has called our attention, and that is the organization of lymph over the ovary. What follows?

The Graffian follicle distends but cannot burst, cannot be relieved, and one after the other enlarges and there is, perchance, a condition of tension, and as I see the pathology of pain in the female pelvis, I translate it into tension. With both ovaries cramped, with distended Graffian follicles, few of them are able to protrude through and burst, you have a condition of tension which is the first cause of chronic ovaritis. These women, if you can save the tubes, do not improve, but saving the ovaries to be subsequently transformed into a condition of tension and chronic ovaritis brings them back to your office and you have to operate again and remove them.

DR. JAMES N. WEST, New York City.—I have listened to the paper of Dr. Van Sweringen with great interest because it has been a subject to which I have paid considerable attention, and a number of years ago, when we were practising conservative surgery upon tubes and ovaries, I followed out my work in about 100 cases of conservative surgery on the tubes and ovaries. I found that women who had one good tube bore children, and that in a number of cases where I dissected both tubes and opened them, only two cases became pregnant. Just at that time Kahn, of Paris, had written an exhaustive monograph on the subject and had found only thirteen cases mentioned in all the literature of women who had had both tubes resected and had borne children afterward. I found in following up this conservative work on the tubes and the ovaries my patients suffered oftentimes with symptoms that were as aggravating as before; that is, they suffered almost as much pain and discomfort as they did before they were operated upon.

I believe I am going somewhat afield from the subject, which was acute infection, but this conservative work was referred to in connection with chronic infection of the tubes and ovaries. The doctor believes in exactly the same thing as I do in handling these cases, particularly those of infections, conservatively. I do not operate upon such cases until I am convinced that pus collection has taken place, and that the patient is beginning to suffer from the toxemia of absorption, and that other structures are beginning to be invaded. I treat the case conservatively at the beginning.

I had an extremely interesting experience last winter of treating two cases with phylacogen, in one of which the symptoms entirely subsided and the woman has remained well, but in the other one in which the symptoms subsided, after three weeks in the hospital I found masses in both sides, and I operated on that woman because she had to earn her own living, and I did not like to turn her out of

the hospital with pus collections in the pelvis. Apparently resolution was going on. I found no actual collection of pus, but I removed the tubes in that case, and I saw in all probability, that that patient would have recovered entirely if I had left her tubes. Perhaps I did not exactly understand the doctor, but I think he said he never operated on any acute pelvic infection. I could not go quite that far, because I believe in pelvic abscesses it is very essential to operate early, for in my experience pelvic abscesses forming in the culdesac do so rapidly and are very dangerous. I have known of several cases that have not been operated on early, having ruptured, and the patients having died quickly from septic peritonitis. Therefore, I think that is an exception to the doctor's rule, but perhaps he referred more particularly to infection of the tubes and not to pelvic abscesses.

DR. EDWARD JOSEPH ILL, Newark, N. J.—It was not my intention to speak on this subject, as I have spoken on it so frequently before this Association, but if I understood the reader of the paper rightly, he talked of acute inflammatory conditions only.

A good many years ago, Dr. Carstens reported that the average death rate from operations in the acute cases was about 17 per cent.; this meant his own cases. Others have had worse experience. I know in a great many hands the mortality was 25, 30 and even 40 per cent.

Very soon after Tait recommended the removal of pus tubes, I went around and asked old doctors whose experience would permit me to have some faith in what they said, what became of those women who had had large pelvic exudates (who had inflammatory masses in the pelvis)—what became of them eventually? They told me so and so has had two babies since, and this one has had one baby since, and the other one has been well ever since. Then came the paper of Dr. Carstens with a large death rate, and I promptly stopped operating on pus tubes, and I had to substitute something to get my patients well.

There were two kinds of ways I tried of keeping these women well. One was purely medical, the other surgical, to open in the culdesac abscesses. In the vast majority of cases you can succeed by the medical treatment. I dislike to tell you what we did, but it has been so successful with us that I want to reiterate it although I read a paper on it some years ago before this association. When we get an acute case of pus tubes we put the patient to bed. The patient is usually very sick. We paint the roof of the vagina with cantharides collodion, raising a big blister. For years we did not know why this had such a beneficial influence on these cases, but it is due to local hyperleukocytosis, and this carries the poison away. The edema rapidly disappeared. We followed that up with treatments of iodine and glycerin, hot douches, saline purgatives, and if it was necessary we repeated the application of cantharides collodion. We put an application of the fly blister above Poupart's ligament. There is nothing to relieve pain more than fly blisters. When the fever has disappeared and when the patient's pain is easy, and we

are very sure we are not lighting up a new trouble, we massage these organs. Our American women will not tolerate the Thure Brand method of massage. It is painful to them. We put the patient in the Trendelenburg position and put a bag of mercury into the vagina weighing 3 or 4 pounds, and leave it in three or four minutes to start with. The next day we leave it in five or six minutes, and if there are no symptoms we leave it in half an hour. The result is that we get intermittent pressure with every respiratory movement, drive out the edema and increase the circulation. We do the same thing as a surgeon does when he puts a tight bandage on a knee-joint, when there is inflammatory trouble, or where one massages a joint. It is astonishing how well these patients will do, and if you have any patients on whom you want to try this treatment, do so at the first opportunity.

As to the permanent results, the vast majority of cases are permanently well. They do not come back to have their tubes and ovaries removed. Do any of them die? I have never seen one of them die during the treatment. Those cases that have recurrent inflammations that go along for a long time, say three or four months, then recur and recur again, are a hopeless task for conservation. They must have some operative treatment. I reported 120 operations of that kind where we removed a portion of the tube. At the time Dr. Polk, of New York, and Dr. Burrage, of Boston, were interested in the same subject. Out of my 120 cases fourteen had children. I have never succeeded before or since of having women become pregnant who had not been pregnant before.

Dr. Charles E. Ruth, Des Moines, Iowa.—I take it from the doctor's paper he refers particularly to the acute inflammatory gonorrheal infection involving the tubes and ovaries. In those cases I am sure that Dr. Van Sweringen takes the proper stand, if my experience is worth anything and that of Dr. Ill who just spoke. No mortality without operation in the acute cases and a mortality of 17 per cent. following operations in these acute inflammatory conditions of the ovaries and tubes should require little further comment, but the doctor did not exclude those other inflammatory conditions that do not so readily obey the common law of the destruction of living organisms in their own excreta, so that we can if necessary, operate safely several weeks or months later if occasion demands. In streptococcic and staphylococcic infections, the acute ones, from whatever cause, we have a different problem. These are the cases of acute inflammation in which we used the sharp, and then the dull curet, and have now abandoned that because by doing so we simply opened up new areas for infection. I remember some of my earlier experiences in this regard. I recall three such cases I had within six weeks. It was very near the time when Dr. Henrotin made the statement that a man who perforated the uterus in doing a curetment was criminally careless, and the next time he did a curetment he perforated the uterus. I perforated the uterus in cureting a case four months after an abortion. I have in mind three cases in which with slight force I put my finger

through the uterus, in different directions, and it is in these cases that the conservatism, as advocated by the essayist, stands us well in hand. Sometimes the septic process has bored holes in the uterus in different directions, as well as having extended into the cellular and connective tissue, and in these cases the course of treatment advocated by the last speaker is not efficient, but incisions into the culdesac and drainage or dilating carefully, and introducing a double tubal drainage, not packing in gauze drains that will produce obstruction, we will not get the best results. Gauze packing in many cases will produce obstruction and should never be used to drain thick pus.

DR. VAN SWERINGEN (closing the discussion).—I have always been greatly disappointed in the treatment of tubal infections, whether puerperal or endometrial, through the vagina. In neither of the two cases I report in the paper could vaginal incision have accomplished anything except the evacuation of some pus. Of course, there are those cases in which that is the only thing you want to accomplish; the patients are *in extremis*, and you make vaginal puncture to get rid of some part of the sepsis, but certainly by the vagina you could not hope to correct the pathology that was present in these cases. In one case the uterus was adherent to the anterior pelvic wall so high up, that I doubt very much whether it could have been reached per vaginam.

I did not refer particularly to gonorrheal infections, and I did not have those in mind so much as I had septic infections which arose from the endomentrium. In the gonococcal infections the mucosa is more apt to be badly involved, and the inflammation, after its subsidence, leaves a scar which is apt to produce a stricture as in a gonococcal urethritis. That stricture may be at both ends of the tubes and a collection of pus in between, and in time, if allowed to remain, you have a hydrosalpinx which is a surgical case. I mean septic infection which is accompanied by an intense inflammation of the walls of the tubes and the whole pelvic structure suffers wherever the infecting agent comes in contact with it. That sort of inflammation gets well; if you do not take out the tube, you will never have to take it out. You might take out a tube which is hopelessly diseased and contains a collection of pus, if it is the original focus. You take that out just as you would in operating on a case of general peritonitis due to appendicitis. You take out the appendix if you can get it, and you open up the collection of pus between the bowels and drain it, but you do not expect any pus left there to remain permanently or any bowel that is involved in the inflammatory process will always be involved. It will get well, and the adhesions between loops of bowel will be done away with by the process of peristalsis. You get anatomatic massage in the belly that is performing its function all right. Peristalsis does it and the upright position in walking. So this particular paper had reference to the acute septic infections.

THE SIGNIFICANCE OF HEMATURIA AND ITS MANAGEMENT.

BY
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WHILE hematuria is of very frequent occurrence, it results from so many and varied conditions that it is often difficult and, at times, impossible to determine its exact causation, or the pathological changes from which it is derived. The exact location of the bleeding, too, is very important in arriving at a correct conclusion concerning its origin and causation. To the superficial observer this symptom assumes but little importance and may be passed over as a trivial affair, when in the great majority of cases it is a most interesting study and can lead one to the correct diagnosis of the basic condition of which it is a symptom. Blood may enter the urine at any portion of its flow, and while it has been claimed that when the blood is diffusely mixed with the urine a high origin is suggested, this condition by no means denies the presence of bleeding from the bladder. Certain forms of hematuria have been classed by some writers as idiopathic because no known lesion has been determined to account for the condition. Undoubtedly many of these cases are the result of passage of minute crystals, especially of oxalate of lime, through the urinary tract. Others have been found to result from vascular conditions in the kidney in which the vessels are so dilated that the term "renal nevus" seems to be justified. It is likely that other conditions also produce similar form of hematuria, the study of which will be taken up under the head of renal hematuria.

The study of hematuria may be classified, according to the location of the bleeding, into renal, including the kidney and its pelvis, ureteral, vesical, and urethral. According to its cause, it may be classified as follows: (1) Traumatic, including accidental injury, and also that occurring from stone. (2) Inflammatory, including acute nephritis, chronic inflammatory affections of the kidney, tuberculosis, acute and chronic inflammation of the pelvis of the kidney, ureter, bladder, prostate, and also acute urethritis. (3) Vascular, blood dyscrasia, such as hemophilia, etc., and nevi, venous obstruction of the kidney, especially that due to torsion in mobility of the kidney; hydronephrosis, varicosity of the vesical veins, especially

that due to prostatic engorgement. (4) Chemical, in which class should be placed hemorrhage from irritating drugs, as turpentine, cantharides, etc. (5) Toxic, in which the hemorrhage is the result of vascular changes occurring in severe toxemias, such as that resulting from malaria, acute yellow atrophy of the liver, yellow fever, scurvy, pregnancy, etc. (6) Neoplastic. (7) Parasitic.

Renal hematuria is probably the form most interesting to the surgeon. Lacerations of the kidney—gunshot and stab wounds—frequently cause hemorrhage which appears in the urine. In many of these cases the damage done to the kidney is slight, and all that is necessary in the management of the case is to put the patient at rest in a recumbent position, when cessation of the bleeding frequently occurs. If, however, the bleeding persists, or there are marked evidences of shock, operative interference will be demanded.

David Newman reports a very interesting case resulting from a gunshot wound of the left kidney. The primary hematuria disappeared, recurring seven years later and continuing so long as the patient was moving about, but was promptly relieved by rest. Nephrotomy and decapsulation gave only temporary relief; nephrectomy was followed by a cure. From the history given in this case it seems possible that the final hematuria, which was the result of a varix, had but little relation to the primary injury to the kidney.

The presence of a stone in the kidney or the renal pelvis is a frequent source of hemorrhage. The amount of blood is sometimes small in quantity and may be increased by walking or riding or any violent exercise. Sometimes it is accompanied by pus, while in others there is no infection. Crystals of oxalate of lime, uric acid, etc., are frequently seen in the urine of these patients. Eshner reports (*Jour. A. M. A.*, May 9, 1903, p. 1326) a case of renal calculus with hematuria in which after the kidney was exposed and found apparently healthy and left undisturbed, the symptoms permanently disappeared. He has collected from the literature a number of similar cases and concludes that there are occasional occurrences in men and women alike, mostly at middle adult life, of hemorrhage from a single kidney—from either with equal frequency, in many instances in consequence of demonstrable organic disorder, and in the remainder of obscure and undetermined origin. This hematuria may cease after simple exposure of the kidney or after nephropexy or nephrotomy, or in the failure of these, after nephrectomy. Since the preparation of his paper he has come across the report of an additional case in which slight mobility of the kidney was accompanied with profuse hematuria.

Tuberculosis of the kidney presents hematuria as an early symptom, the amount of blood varying very greatly in different cases. In some instances a few isolated red cells are found, in others a profuse hemorrhage and even blood casts are found. Pyuria and dysuria frequently accompany this form of hemorrhage. Tuberculous hematuria is most likely to be met in patients of from twenty to thirty years of age.

Hematuria is often an accompaniment of an acute nephritis. In some cases it is caused by a bilateral nephritis, only one kidney bleeding; and in cases of unilateral nephritis hematuria may be the only sign of the condition, the lesions in the affected kidney consisting of circumscribed areas of sclerosis and of acute and chronic diffuse nephritis. A case of this kind is reported by Johnson (*Surgical Diagnosis*, vol. ii, p. 512).

Vascular hematuria results from changes in the renal vessels, especially the veins, from obstruction to the venous circulation, nevi, varicosities, etc. Also those hemorrhages which result from a blood dyscrasia, such as hemophilia, etc.

Ingestion of certain drugs, such as turpentine, cantharides, copaiba, etc., in toxic doses frequently produces hemorrhage from the kidney. In therapeutic dosage such result does not obtain. The intravenous use of hebdonal in the production of anesthesia in large amounts (10 per cent.) has been known to produce hemoglobinuria. The chemical products of severe toxemias, such as that resulting from malaria, acute yellow atrophy of the liver, yellow fever, scurvy, etc., produce so much damage to the walls of the vessels of the kidney that hematuria is a not unusual accompaniment of these conditions. In severe burns the toxic product has also been known to produce this symptom.

Tumors of the kidney of all forms are usually first detected by the presence of blood in the urine. Angiomatous growths of the pelvis of the kidney, while very rare, are also causative of this symptom. The hemorrhage from a malignant tumor of the kidney will rarely persist for more than two or three years. Should a tumor continue to grow and the hemorrhage to persist for a longer period than this the growth is probably hypernephroma.

The development of hematuria in children is always suspicious of a renal growth, although the same symptom is met in Barlow's disease. The hematuria occurring in connection with tumors of the kidney is usually painless in character and unaccompanied by pus or crystalline elements in the urine.

Parasites.—A few parasites produce hematuria. Among these

may be mentioned distoma hematobium, prevalent in Egypt, Cape Colony, and other parts of Africa. A few cases have recently been found in this country. A new blood fluke is recorded by Catto, in *British Medical Journal*, Jan. 7, 1905, which causes renal hemorrhage. He found adult trematodes, male and female, in the blood-vessels, the ova in the uterus of the female corresponding in every particular with the oval bodies found in the various viscera. The life history of this new schistosome corresponds with that of other trematodes, especially the S. hematobium. It differs from the latter in that (1) the habitat of S. hematobium is said to be venous only, whereas the habitat of the new schistosome is mainly arterial; (2) the ova of S. hematobium affect mainly the urinary system and escape from their human host by this channel. In the new species the ova apparently affect exclusively the alimentary system, escaping by this route from their human host. The geographical distribution differs, for no case of bilharziosis has yet been met in China. Catto describes the new organism in detail.

Formerly the term "essential renal hematuria" was applied to those conditions in which the pathology was somewhat obscure, and a large number of cases were included under this head. Similar cases have been described as functional, painless and symptomless hematuria. Undoubtedly there are some cases of renal hemorrhage in which a most careful and painstaking analysis cannot discover a pathological lesion as the cause, the only condition present being hemorrhage without other symptom of renal disease, and in the absence of any pathological change in the kidney it seems to the writer that the term "essential renal hematuria" is best suited to cover this class of cases which in our increasing knowledge will become smaller from time to time. The term "symptomless" seems to be a misnomer.

Among the conditions which have formerly been overlooked as causative factors in this type of renal hemorrhage are hematuria from prolonged muscular effort, usually confined to a single attack, also a varicose condition of the veins of the renal pelvis or a single papilla has occurred. A very interesting case of this kind came under the observation of the writer. Fenwick, David Newman and others have reported similar cases.

Schuller reports a number of cases to show the errors liable to be made on the assumption of "essential hematuria," etc. Cases of doubtful character have been designated by some writers as hysterical hematuria, nephralgia, angioneurotic hematuria. Under the head of "Paroxysmal Hematuria" Thompson describes this dis-

order as a profound neurosis, chiefly affecting the vasomotor system and called into activity by exposure to moderate degrees of cold, by muscular fatigue, or mental emotion.

Hematuria in Hydronephrosis.—Bangs discusses hematuria as a symptom of hydronephrosis. He states that a thorough and careful review of the literature failed to discover any cases of this kind except in one instance. In a series of forty cases, among which there were nine presenting hematuria as a symptom, he adds one case to the list in a patient of nineteen. The hematuria was intermittent, variable in quantity, increased by slight trauma, such as jolting in a wagon and by manipulations of the kidneys necessary to a diagnosis. He lays stress on hematuria as a symptom of hydronephrosis. The writer has observed this symptom in one case of hydronephrosis of large size resulting from stone.

Hematuria in Pregnancy.—Hematuria occurring in pregnancy may result from pressure upon the veins of the kidney or upon the vesical veins. Hemorrhage may occur from either one of these locations. In cases of intense toxemia resulting from this condition the occurrence of hematuria is not unlikely.

Ureteral Hematuria.—Hemorrhage from the ureter occurs as a result of traumatisms incident to calculus, in some cases of hydronephrosis, and as a result of traumatism in catheterization.

Vesical hemorrhage may result from inflammatory changes in the bladder wall, traumatisms incident to instrumentation, dilatation of the vesical veins due to inflammatory conditions in the prostate gland, and from tumors causing pressure upon the vesical neck, from pregnancy, also from papillomatous growths in the bladder and from malignant disease. Hemorrhages from the urethra occur as a result of traumatism, inflammation, constriction, passage of stone, and presence of foreign bodies.

Diagnosis.—The diagnosis in this condition has for its object the discovery, first, of the blood in the urine, and, second, of the source of the hemorrhage. The presence of blood in the urine may be told by its color and by chemical and microscopical tests. The presence of red blood cells in the microscopical field are characteristic and distinguish true hematuria from hemoglobinuria.

Renal hemorrhage presents the blood thoroughly mixed with the urine, giving uniformly red, smoky or brown color. If the hemorrhage is from stone the amount is usually small and will appear at more or less prolonged intervals. Repeated urinalyses of over thirty days' duration will almost certainly detect a few blood cells if calculus is a causative factor.

The hemorrhage from tuberculosis of the kidney occurs either in the early stages from congestion of the surrounding renal tissue, or in the latter stages from rupture of the tuberculous focus into the pelvis. Hemorrhage is present at some time in all cases of tuberculosis of the kidney. It is usually accompanied by pyuria, frequent passage of a large quantity of urine, and also painful micturition.

Vesical hemorrhage is found especially at the end of the urinary act, the first urine may perhaps have been clear. In some instances the urine is bloody throughout. Clots are very frequently present in hemorrhage from the bladder. Hemorrhage from the urethra is frequently noted apart from the act of micturition and bleeding continues for some time after the bladder is emptied.

Before the introduction of the cystoscope the diagnosis and location of the hemorrhage usually depended upon the time of its appearance, its character and the shape of the clots, but these are misleading at times and by means of the cystoscope and ureteral catheter the source of the hemorrhage can usually be determined without difficulty. In order to determine the underlying causative condition and to make a differentiation between renal calculus and renal tuberculosis skiagraphy is an invaluable aid. Tubercle bacilli can be detected after sedimentation of urine. At times, however, repeated examinations must be made before this organism is found. In a doubtful case it is well to inoculate an animal and notice the development of a tuberculosis.

Prognosis.—Prognosis depends upon the source, cause and quantity of hemorrhage.

Treatment.—The most important thing in the treatment of all forms of renal hemorrhage is rest in bed and the local use of the ice-bag. Morphia is to be administered to quiet the nervous system of the patient concerning the hemorrhage. Adrenalin, ext. hydrastis, hamamelis, gallic acid, lead acetate, chloride of calcium and ergot have all been recommended in this condition. The writer has found turpentine in small doses to be the most satisfactory of all internal remedies. In the hands of some tincture of cantharides in two to five drop doses has been found to be of service in relieving renal congestion. R. L. Rigdon (*Amer. Journ. of Urology*, April, 1910) suggests the employment of the injection of medicinal substances into the renal pelvis to control papillary hemorrhage, as a diagnostic measure. Undoubtedly such a plan will be more productive of harm than good. Hugh Young has employed adrenalin injected in this way to control the hemorrhage.

The injection of horse serum, properly employed, may be productive of benefit. Hemorrhage produced by parasites is best relieved by the internal administration of parasiticides. Fouquet affirms the value of the extract of male-fern internally in this form of distomiasis.

Surgical Treatment.—This depends entirely upon pathological cause and the site of the hemorrhage. In hemorrhage from the kidney resulting from stone, tumors, traumatism of persistent type, and unilateral tuberculosis, operative intervention is demanded. The procedure employed must meet the conditions found on the table. Some cases of bilateral tuberculosis of the kidney improve markedly upon usual methods of treating tuberculosis, as fresh air, sunlight, proper diet, light exercise and rest. The internal administration of creosote and small doses of turpentine are valuable adjuvants. Varix and nevi are at times relieved by nephrotomy, nephropexy, by splitting the capsule, or, as in some reported cases, simply by cutting down upon the kidney and lifting it from its bed. The exact *rationale* of the result in the latter is not apparent.

Hydronephrosis needs appropriate treatment. Stone demands removal from the pelvis or ureter. Inflammatory conditions in the kidney are treated according to usual methods. Ren mobilis producing hematuria demands fixation. The treatment of ureteral hemorrhage is carried out along the same lines employed for that from the kidney. Hemorrhage into the bladder is in almost every instance a surgical affection. Some of the smaller papillomata can be removed by an intravesical operation through the cystoscope. Small bleeding points may be successfully cauterized. The larger number of cases, however, will demand a cutting operation for relief, such as for stone, benign and malignant growth, enlarged prostate, as well as intractable cases of cystitis and rupture of the bladder from traumatism. Inflammation of the bladder will usually respond to local treatment. In some patients it can only be relieved by drainage. Many cases of vesical tuberculosis recover fully after the removal of the tuberculous kidney. Urethral hemorrhage is to be treated along the usual lines.

ACUTE UNILATERAL HEMATOGENOUS NEPHRITIS.

BY

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ACUTE bilateral nephritis of hematogenous origin has long been an object of medical knowledge. In fact, the prevailing opinion, formed from both pathological and clinical studies, is that acute nephritis of hematogenous origin is always bilateral. This is in a large measure true when we find it as a complication or sequela of scarlet fever, diphtheria, small-pox, typhoid and other infectious diseases. The infection in these cases is carried to the kidneys by the blood stream, and while the disturbance in the kidney is caused by the toxins, which, at times, do cause cellular necrosis, yet it is rare that suppuration occurs, and the resultant kidney lesions remain within the medical category.

But there is a rarer, more serious type which is of interest to the surgeon, in that it attacks a person apparently well, often without warning, and may present a typical picture of certain of the grave abdominal emergencies, such as appendicitis, cholecystitis or visceral perforation. While these cases are regarded as rare, to have met with four cases within a period of a year leads one to the belief that acute unilateral hematogenous infection of the kidney is a much more common disease than is generally supposed and considering the fact that two of these cases were previously diagnosed as appendicitis justifies one's suspicions that they are not, as a rule, recognized by the profession at large. A hasty review of the literature on this subject corroborates this opinion, for Brewer who first recognized the surgical importance of the subject says: "Of nine cases which came under my observation, only one came in with a diagnosis of renal infection." In 1908 Cobb presented a series of eight cases operated on in the Massachusetts Hospital by himself and colleagues and reviews previously published data. Since then, however, reports have been few and scattered, but if we judge by the number of demonstrated cases in the hands of a few men, these cases cannot be unusual.

Acute suppurative nephritis of hematogenous origin is a condition resulting from the infection of the kidney by certain microorganisms,

in particular by the pyogenic cocci and the colon bacillus. It is of a metastatic nature and, when developed in both kidneys, is generally consecutive to a septic process or a specific infection somewhere in the body, so while it is well understood that in the presence of a septic focus elsewhere, metastatic or embolic abscesses may occur in one or both kidneys, it is not so well understood that an individual apparently well and in whom no septic lesion can be demonstrated may have an infection of the kidney with one or more septic infarcts or abscesses. It is a well-known and generally accepted fact, that during the progress of any infectious disease a certain number of microorganisms find their way into the blood stream. It has also been shown by numerous experiments that these organisms are excreted through the kidneys; if their number is small, their virulence low, and the kidney healthy, the transit of these organisms through the renal apparatus gives rise to no demonstrable lesion. If, on the other hand, their number is many, their virulence high, or if one or both kidneys are diseased, lesions are produced which may vary from a slight cloudy swelling to a destruction of the organ by necrosis.

The pathology of acute unilateral hematogenous infection is entirely different from the bilateral kidney infections. The lesions most commonly found in these cases (unilateral) are due to a plugging of the small arteries and capillaries with groups of organisms surrounded by a zone of round-cell infiltration and are of two distinct types:

1. Abscess formation.
2. Diffuse inflammation without tissue necrosis.

In the abscess type the kidney is somewhat large, congested and with minute abscesses seen beneath the capsule and throughout the cortex. From here other portions of the kidney are involved, forming parenchymatous abscesses which may ultimately coalesce and rupture through the capsule, giving rise to a perinephritis, or into the pelvis giving a typical picture of pyelonephritis. So severe is the toxemia in these cases that the resistance of the individual must be great, and the virulence of the infective organism of so slight a character before this cycle can be completed, that death usually intervenes before the process reaches the extensive abscess stage.

The form of organisms usually producing this type of infection are the pyogenic cocci, the staphylococcus albus and aureus, the streptococcus pyogenes.

The second type of the disease, the diffuse inflammatory, has a diffuse inflammation spreading through the kidney, but does not

result in focal necrosis or solution of tissue. The lesion consists of inflammatory exudation, endothelial leukocytes with fibrin formation and a few polymorphonuclear leukocytes. The kidney is large and congested. In the early stages of the process there are irregular purplish areas under the capsule. These areas are of much the same character as presented by the normal kidney in rough handling and bruising during the ordinary operations on it. On section the organ is found to present irregular, circumscribed, reddened or yellowish areas involving the cortex and pyramids or involving the whole kidney without any solution of tissue. In some instances the whole kidney is covered with these purplish areas and the split kidney may present an acutely reddened surface due to the involvement of the whole organ. Until the experimental research work of Buxton, Torrey and Cannon, it was thought that when large numbers of bacteria were in the blood, whether by a general infection or experimentally by injection into the veins or the peritoneal cavity, that most of the bacteria passed through the kidneys were eliminated through the urine, and that the disturbance to the kidneys was great. The work of these men proved, however, that the majority of organisms introduced into the circulation were destroyed before reaching the kidney, and while many bacteria were eliminated by the urine, it is unusual for bacteria to lodge in the kidney, provided the kidney and ureter were normal.

Sampson performed a series of experiments on dogs in which he tied the ureter of one kidney and injected pure cultures of staphylococcus into the jugular vein. He found that bacteria were eliminated by the urine and only in those cases in which the ureter was tied did the kidney become infected.

Brewer followed these experiments by injecting bismuth into the pelvis of the kidney and ureter and subjected the kidney to various forms and degrees of trauma. In a large number of these cases lesions were produced in the injured kidney identical with those of his clinical cases.

These experiments point a way to the understanding of the workings of clinical conditions as factors in the etiology of kidney infections. Most cases are probably unilateral in the beginning. A source of infection must exist somewhere in the body, although it is not always easy to ascertain the focus. Since the colon bacillus is the most prolific source of infection we may infer, with reason, that intestinal stasis, a break in the intestinal mucous membrane, or even in long-continued constipation, the bacteria pass through the intestinal wall in large numbers.

The bladder, the prostate, the uterus and its adnexa are additional possible sources of bacterial infection of the kidney through the blood. In addition to the entrance of infection there must be some cause, traumatic or otherwise, operating to reduce the resistance to renal tissue. The kidney may have been injured by a fall or a blow upon the loin; it may be prolapsed or rotated on its axis, so that the circulation is deranged, or the ureter may be abnormal due to stricture or some deformity encumbent on pregnancy or childbirth.

Sampson has demonstrated that the blood-vessels of the kidney communicate with the bladder, aside from the general circulation, through two other channels, the uteroovarian and the vessels of the ureter itself. By injection he demonstrated a free arterial anastomosis between the branches of the renal artery supplying the capsule of the kidney about its lower pole, the kidney and the branches of the ovarian artery. The ovarian artery has a free anastomosis with the uterine and the vesical. This anastomosis is both venous and arterial, so it is therefore possible for a septic focus in the bladder, uterus or the adnexa, to infect the kidney by way of the general circulation or through anastomotic channels directly.

With these preliminary remarks on the pathology and etiology, I would like to report a small series of cases, four in number, in which the operative findings of three illustrate the diffuse inflammatory type and which, at the time of operation or subsequently, had not reached the stage of abscess formation or solution of renal tissue.

CASE I.—Mrs. George S., aged twenty-two, came to the hospital on September 18, 1912 with a diagnosis of appendicitis. Previous history negative, except that six weeks previously she had been confined, but with a puerperium normal in every way. She was suddenly seized with pain in the right lower quadrant of the abdomen. The chief point of tenderness was a little higher than McBurney's point. The chief characteristic about this woman was her very acutely ill look, her face suggestive of a typhoid or pneumonia. Examination of pelvis negative, abdomen rigid over right rectus and painful to the touch. Tenderness over the costovertebral angle. Temperature 104°. Pulse 130. Urine examination showed albumin positive, a few red blood cells, a few degenerated leukocytes, and a few granular casts.

Diagnosis.—Acute infection of the right kidney; operation advised, but refused until twelve days later. In the meantime, the temperature for the first four four days was between 103 and 104°; for two

days it ranged between 99 and 101°. It then reached 103° for a few days, dropping to 101°, where it remained with evening rise until the operation.

During this time the bladder was examined and the ureters catheterized. Bladder negative. Urine from the right kidney showed albumin, pus cells, red cells, and a few casts. Urine from left ureter normal.

Obtaining consent to operate the usual incision for kidney exposure was made. The perirenal fat was edematous, the kidney was congested, and covered here and there with purplish spots about the size of a finger nail. The capsule was stripped, drainage instituted, and the wound closed. There was considerable temperature reaction following the operation, the temperature going to 103°, remaining at 102° with remissions for four days, when it reached normal in seven or eight days following operation.

CASE II.—Mrs. J. W., aged thirty-two. Was suddenly seized with pain in the right loin and right side. She was sent to a hospital in a neighboring town with a diagnosis of appendicitis. She had a temperature of 103°. Pulse 120. Respirations 26. Three days after admission she had a chill lasting ten minutes. For three days after the chill the temperature remained at 104°, with slight morning remissions. The temperature was very irregular from that time, ranging from 98° morning to 103° evening until eighteen days after admission. She was tender and rigid over the anterior right abdomen, especially over the lower part of the ascending colon. There was marked tenderness over the costovertebral angle. Urine had shown albumin, pus cells, and red blood cells. This patient looked markedly toxic and prostrated and seemed a very poor risk for any surgical operation. The usual kidney incision was made and kidney exposed. The kidney was large, about one and a half times its usual size, and was studded with red purplish spots under the capsule. Owing to the size of the kidney and the marked toxemia in this case, it seemed possible that embolic abscesses might be present in the interior. The kidney was, therefore, split along its convex border from pole to pole. No abscesses were found, but wedge-shaped areas were found with their bases at these purple cortical spots. The capsule was stripped, the kidney drained and sutured. Four days after the operation she had a chill followed by a temperature of 106°. After three more chills on two successive days her temperature came to 100°. Here it fluctuated between that point and normal for seven days when it reached normal and remained there.

CASE III.—Mrs. O. T., aged thirty-two. Married. Seven months pregnant. In the last three months has had several attacks of pain in the right loin. A few days before admission has had pain in the right side of the abdomen with fever, nausea, headache and prostration. Temperature 102°; pulse 140; respiration 28. Urine examination showed albumin, a few pus cells, and a few red blood cells. Examination of the abdomen showed tenderness over the right side below the margin of the ribs, rigidity of the upper rectus and tenderness in the costovertebral angle. On exploring the right kidney by lumbar incision it was found enlarged and congested. Several small purplish spots were found under the capsule. The capsule was stripped, the kidney drained. The temperature came to normal on the eighth day and the fistula closed two days later.

CASE IV.—H. B., aged seventeen. Female. About two months ago fell and struck her right side. Her side was sore for a day or two, but it quickly passed away. Three weeks after she had severe pain in the upper right loin and abdomen. Temperature 104°; pulse 110; leukocytes 23,000. She had been in bed a month when I first saw her, during which time her temperature had ranged from 100° morning to 103° evening. During the first week of her illness her urine showed nothing pathological except a low specific gravity and a few white blood cells. After a week's duration urine showed albumin, a few pus cells and a few red cells. Catheterized specimen of urine from right kidney showed slight trace of albumin, pus cells, a few red blood cells. Left kidney normal. Pus showed Gram positive bacilli in chains and Gram negative cocci in chains. Phenosulphophthalein test showed right kidney (one-half hour collection) 2 per cent. Left kidney 10 per cent. Physical examination showed pelvic organs normal, tenderness over the anterior upper abdomen and in the costovertebral angle.

Although this patient's symptoms persisted, her temperature ranging from 104° evening to 100° morning, she refused operation and after seven weeks her temperature reached normal.

Diagnosis.—The diagnosis of these acute cases is not, at first sight easy. The disease may be preceded by a chill, which, with the initial high temperature, rapid pulse and intense toxemia may suggest pneumonia, grippe or one of the exanthemata. The sudden acute abdominal pain, tenderness, muscular rigidity, high temperature and pulse, with a high leukocyte count, may suggest almost any of the grave abdominal emergencies. Fortunately, however, careful palpation in the region of the kidney will furnish evidence of kidney involvement. I have found costovertebral tenderness

in all of my cases. This symptom has been so constant in Brewer's series that he regards it as a pathognomonic sign.

In a large majority of the cases a careful examination of the urine will show albumin, pus, and blood cells. In the less acute cases the condition of both kidneys should be investigated both by catheterization and by the *x*-ray.

In the acute cases, however, which may simulate any of the abdominal crises and where the urine shows neither pus, blood nor albumin, and the kidney shows neither enlargement nor tenderness, it is justifiable to make a preliminary anterior incision to prove the diagnosis and establish the existence of the other kidney.

Treatment.—The treatment of these cases is essentially surgical. There are, however, cases that recover without operation, as, for example, Case IV; and as noted by Cobb, Brewer and Cunningham, even in acute fulminating attacks. There are, however, cases of acute appendicitis that recover, but we never know that they will. Just what is the operation of choice depends on the type of infection and the pathology found on exposure of the kidney.

In the acute cases, with multiple miliary abscesses and from which an overwhelming toxemia results, nephrectomy must be the operation of choice, if we would save the patient's life.

Of the fourteen cases of this type encountered by Brewer, two were untreated, and in four nephrotomy with drainage was done; they all died. The remaining eight were treated by nephrectomy with recovery in each case.

In the acute diffuse inflammation of the kidney the treatment is not so well defined and must depend more on the course of the disease in the individual case. In those cases where the areas of infarction are very numerous, to such an extent that the function of the kidney is seriously impaired, and when the toxic symptoms are very pronounced, nephrectomy should be the operation of choice. For example, while Case II in the above report recovered with nephrotomy and drainage, her convalescence was stormy and not without grave danger. Were I to repeat this operation, nephrectomy would be the choice.

In cases where the infarcts are few in number, the toxemia is mild and the general condition of the patient good, splitting of the capsule with drainage of the diseased areas should be considered. Cases are on record, however, in which the symptoms have recurred after this operation and in which a subsequent nephrectomy was necessary.

THE DIAGNOSTIC AND THERAPEUTIC VALUE OF THE RENAL CATHETER.

BY

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Pittsburg, Pa.

(With Twenty-five Illustrations.)

So frequently has the writer found in the renal catheter an instrument of great diagnostic and therapeutic value, that he felt justified in selecting it as a subject for a paper before this Society.

DIAGNOSTIC VALUE.

By the aid of a plain renal catheter, we are enabled to obtain separately the urine from each kidney for analysis, find the functional activity of each, investigate the renal pelvis so far as residual urine and renal capacity are concerned, and discover ureteral obstructions and their location. With the aid of the *x*-ray, the catheter can definitely diagnosticate and locate ureteral and renal stones (the *x*-ray information alone is frequently misleading); can give us ureterograms and pyelograms which show the abnormalities in the ureter demonstrate the size, form and position of the renal pelvis and frequently discover the cause of the renopelvic changes.

A RENAL URINE SPECIMEN FOR ANALYSIS.

The value of the renal catheter in obtaining a specimen of urine from a kidney is so self-evident that it hardly requires any discussion. An examination of a voided abnormal specimen of urine, containing pus, blood, etc., cannot locate the seat of pathology. It cannot locate it even with the assistance of a cystoscopic examination; for positive cystoscopic findings in the bladder do not exclude the kidney as a primary cause of the trouble, and negative findings do not indicate which of the kidneys is responsible for the abnormal constituents of the urine.

Observations of the ureteral ostia through a cystoscope or obtaining the kidney urines with a segregator may give us a great deal of information, but such information is neither complete nor always

reliable. By the aid of the renal catheter we can study separately the urines of both kidneys and decide which of them secretes the abnormal urine or which of them is diseased.

FUNCTIONAL ACTIVITY OF THE KIDNEY.

By the catheter we not only obtain a urinary specimen from a single kidney for analysis, but the urine so obtained enables us to investigate the renal functional activity.

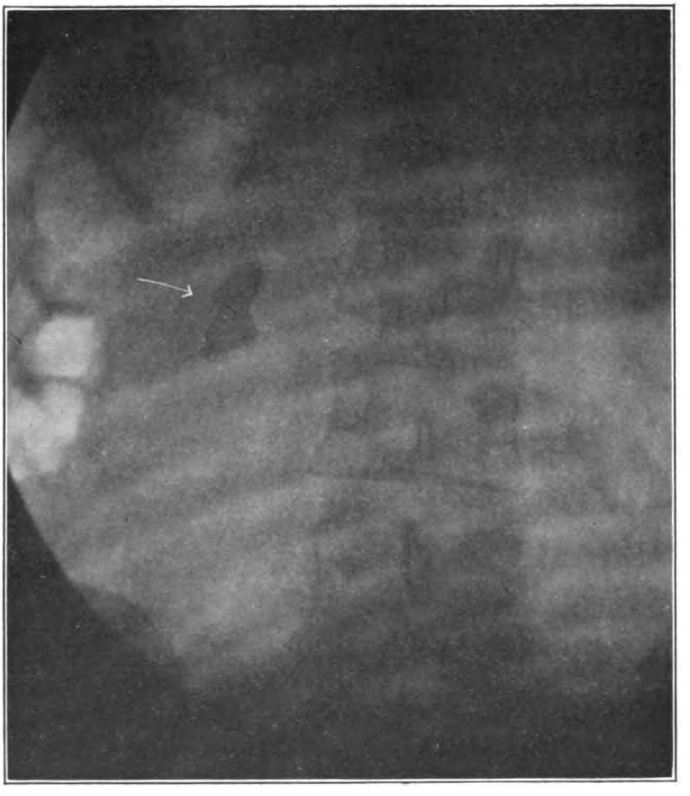

FIG. 1.

Before a nephrectomy is performed we must make sure that the better kidney of the two is capable of performing the functions of both. In other words, we must find out whether the functional ability of the healthy kidney is sufficient to take over the work of the diseased kidney. Nitrogen elimination test, chloride of

sodium elimination test, benzoic acid, phloridzin, methylene blue, indigo-carmine, phenolsulphonephthalein tests, are now used to determine the efficiency of the renal function. While there are differences of opinion as to the relative value of these tests, there is hardly any question as to the necessity of a functional test in cases to be subjected to a radical kidney operation. The renal catheter passed into the healthy kidney supplies the urine for this important test.

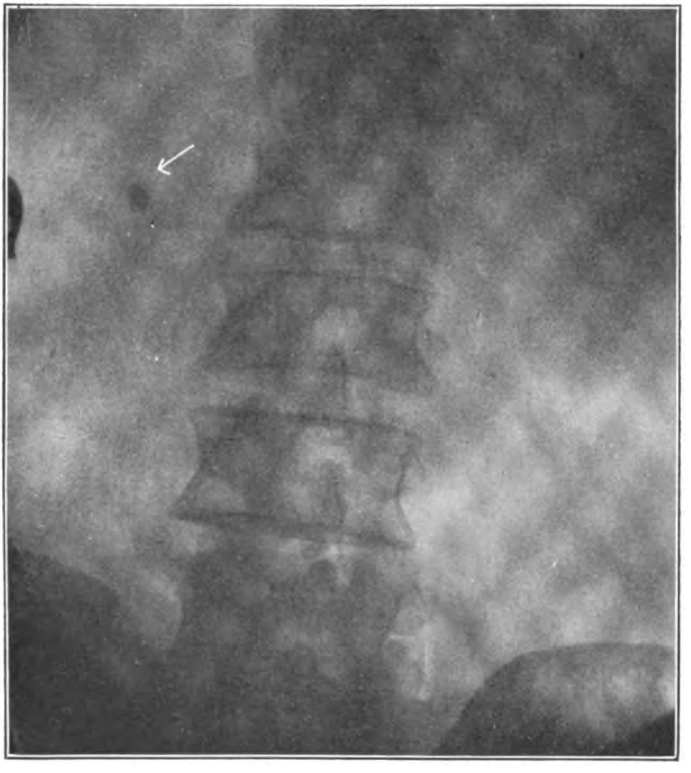

FIG. 2.

STUDY OF THE RENAL PELVIS; RESIDUAL URINE.

In our study of the condition of a diseased kidney, it is important to get all the possible information about its pelvis. By passing the catheter into the renal pelvis, we are enabled, first of all, to discover residual urine when present.

A normal pelvis of the kidney (by this we mean the surgical pelvis, *i.e.*, the anatomical pelvis *plus* the minor and major calices)

holds about 4–5 c.c. of urine. It is never distended with urine to its full capacity, for it empties itself with each ureteral contraction. If, therefore, a catheter, introduced into the pelvis of kidney, causes a continuous outflow of urine of more than 5 c.c., we can take it for granted that we have in the pelvis residual urine. We must not, however, mistake à nervous polyuria for residual urine. Such a

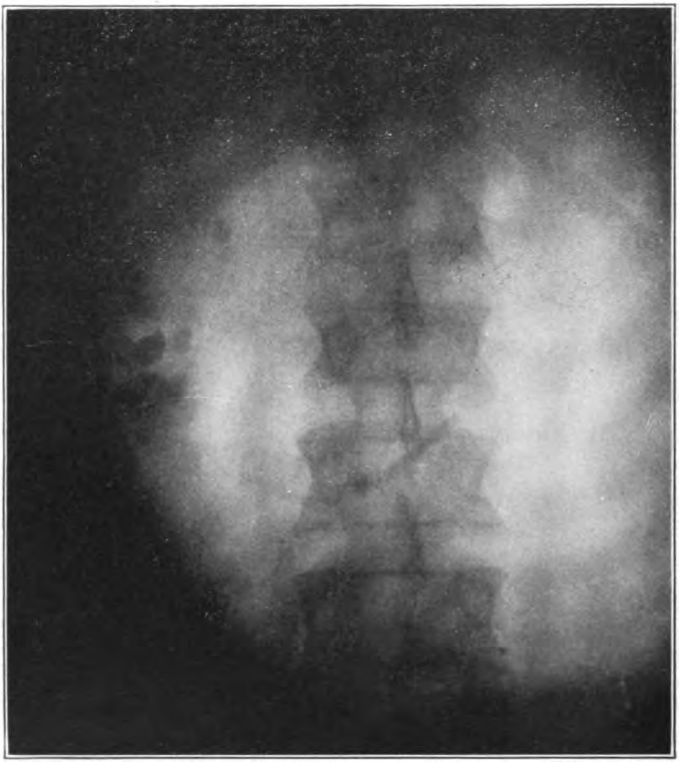

FIG. 3.

mistake can be avoided by remembering that in nervous polyuria the urine is pale and clear and its flow is not influenced by pressure over the kidney, while in the case of residual urine, the urine may be either turbid or clear, but of a deeper color, and its flow is accelerated by pressure over the kidney. The presence of residual urine is usually suggestive of a dilated pelvis, but the extent of such dilatation is best decided by testing for renal capacity.

RENAL CAPACITY.

The renal capacity of a kidney or the degree of its dilatation can be found by injecting into the pelvis, through a renal catheter, a fluid to the point of tolerance. This point of tolerance is demonstrated by the sudden pain in the kidney and by the return flow from the ureter into the bladder (cystoscopic observation). The

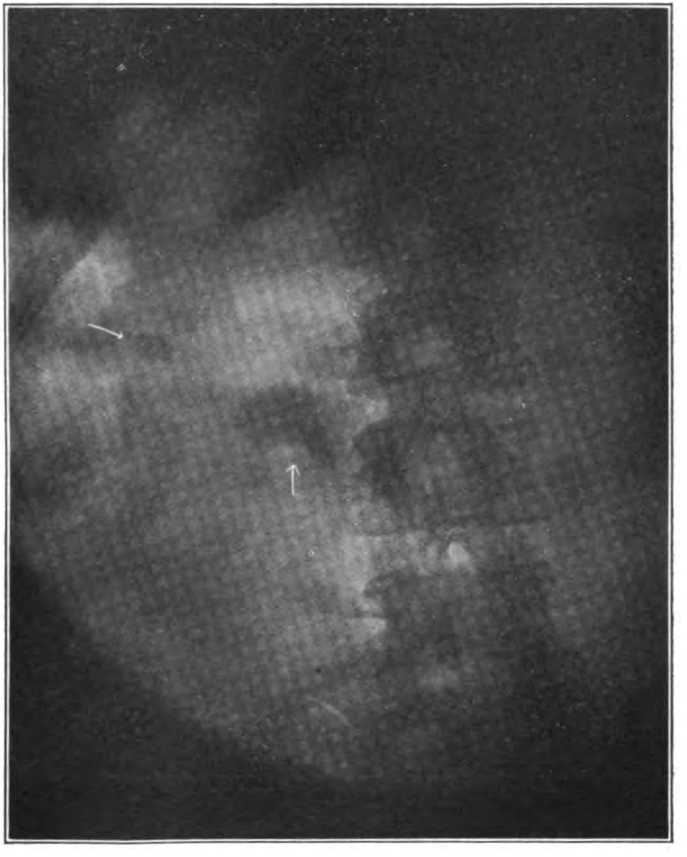

FIG. 4.

quantity of fluid injected before the appearance of pain gives us a definite idea as to the capacity of the kidney. A renal pelvis admitting more than 50 c.c. of solution is considered hydronephritic or pyonephritic, depending, of course, on the character of its contents. To get a good approximate idea about the capacity of a renal pelvis, we must make sure that the catheter is passed into the kidney.

(We can tell, as a rule, that the catheter is in the pelvis by observing a continuous dropping of the urine from the catheter instead of the intermittent flow that we see when the tip of the catheter is in the ureter.) This precaution is an important one, for if the tip of the catheter is in the ureter, pain will be induced as a result of ureteral dilatation, with a very small quantity of fluid.

The size of the catheter used for this test is also of importance. We must use a rather large-sized catheter to prevent the return flow

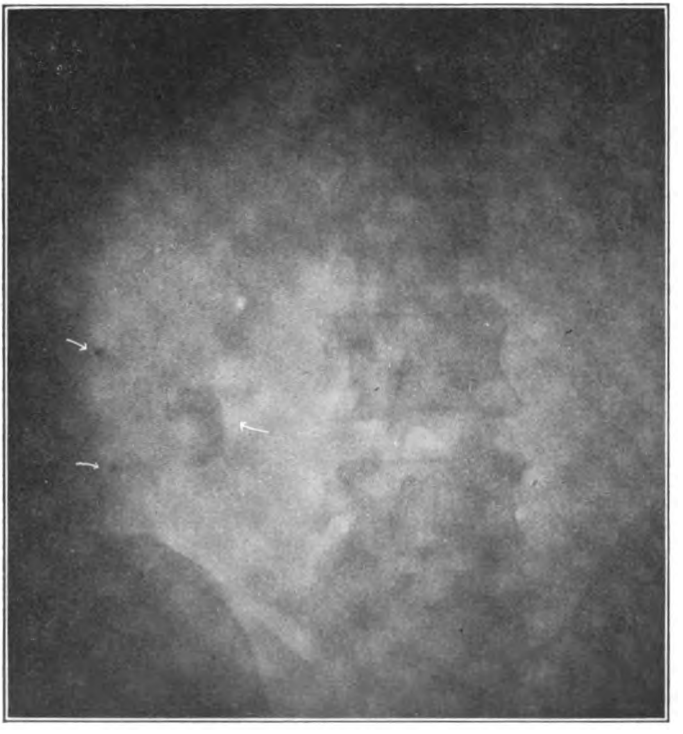

FIG. 5.

of the fluid from the pelvis before its complete dilatation. In this connection we must remember that occasionally we meet a healthy kidney that resents an artificial dilatation with the smallest amount of fluid. Under this condition we are liable to be misled into the belief that we deal with a contracted pelvis. An injection of a safe amount of a solution of novocain will easily clear up this difficulty for us. On the other hand, we may meet occasionally a relaxed pelvis in a nervous patient that admits large quantities of fluid

without any discomfort, although the kidney is perfectly normal otherwise. Such cases, however, are exceedingly rare.

DIAGNOSIS OF OBSTRUCTION IN URETER.

One of the most valuable uses of the renal catheter is that of a searcher to discover the location and character of ureteral obstruc-

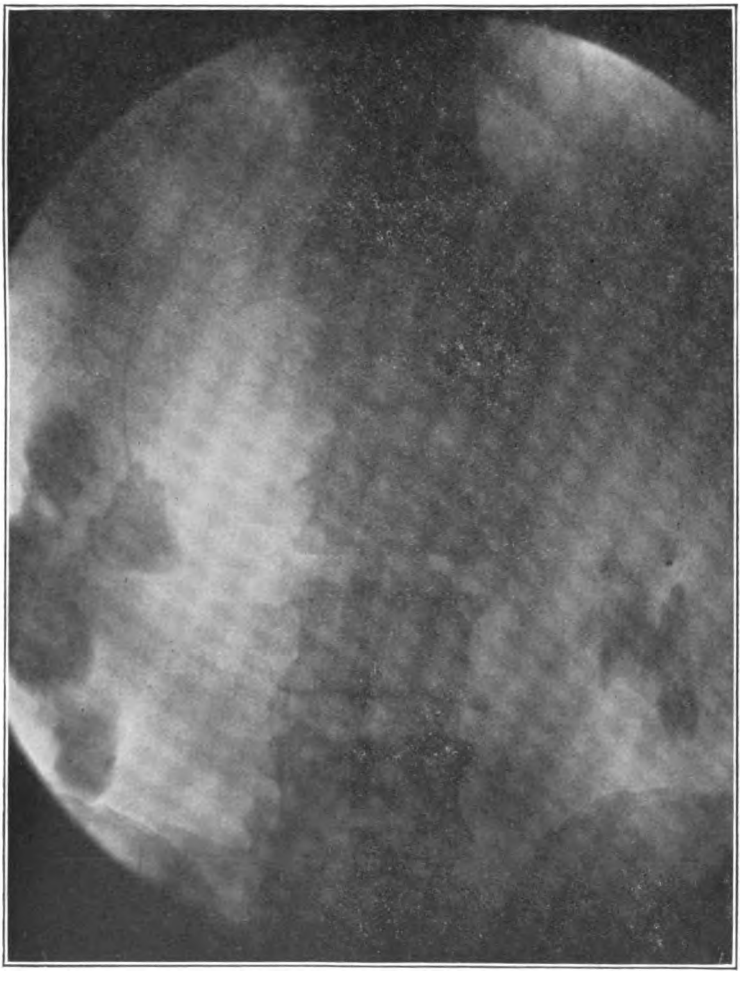

FIG. 6.

tions. Normally, after entering the ureteral opening, the catheter should encounter no difficulty in its passage toward the pelvis. It is true that the point of the catheter may be caught in the normal

mucous membrane of the ureter and give us an impression of obstruction, but repeated up and down motions of the catheter, as well as an injection of water or oil, will usually allow the passage of the catheter. If, on repeated examinations, the catheter is arrested at the same distance from the ostium of the ureter, the diagnosis of obstruction

FIG. 7.

can be definitely made and the seat of the difficulty exactly located by the graduated catheter. A ureteral obstruction may be caused (1) by foreign bodies within the ureteral channel, such as calculi, blood or pus clots, accumulations of urinary salts, etc.; (2) by changes within the ureteral walls, such as strictures, kinks, twists, valves, diverticulæ, and (3) by pressure from without such as inflam-

matory exudate surrounding the ureter (parametritis, tubo-ovarian abscess, etc.), anomalous blood-vessels crossing the ureter near the pelvis, tumors, etc. The renal catheter can discover the presence of an obstruction, but unaided it does not, as a rule, discover the kind of the obstruction. A wax-tipped catheter, used through an endoscope in a female may discover a calculus by the marks upon

FIG. 8.

the wax; an ordinary catheter may discover obstructing blood clots, pus clots and accumulations of urinary salt by carrying off particles of them through its lumen. As a rule, however, the assistance of the *x*-ray must be obtained to differentiate the kinds of obstructions.

DIAGNOSIS OF CALCULI.

A renal catheter opaque to the *x*-ray, when inserted into the kidney and radiographed, demonstrates the course of the ureter and locates

the pelvis. Such a catheter is especially valuable in nephrolithiasis and ureterolithiasis, the diagnosis of which is usually difficult. While the *x*-ray is widely used in examination for renal and ureteral stones, it does not always definitely settle the question. It frequently fails to give a shadow of calculi in stout people or in people

FIG. 9.

presenting an abnormal opacity to the rays. It fails to demonstrate uric-acid stones even in thin people. (Here a wax-tipped catheter is very useful.)

Again, the *x*-ray plate* may show shadows of phleboliths, fecal bodies, calcified glands, and old inflammatory connective-tissue formations that may be easily misinterpreted as calculi. There are unquestionable shadows that can be correctly diagnosticated as

* The radiograms of this article were taken by Dr. Geo. W. Grier, Roentgenologist of the Western Pa. Hospital.

renal calculi without a catheter. Take plates Nos. 1, 2 and 3, they show pictures of foreign bodies which in their shape and location quite definitely determine the presence of renal stones, but take No. 4 and you cannot be certain whether all the foreign bodies are stones, and they are, whether they all are in the pelvis. The same holds good of plate No. 5. Again take Plate No. 6, with four shadows on

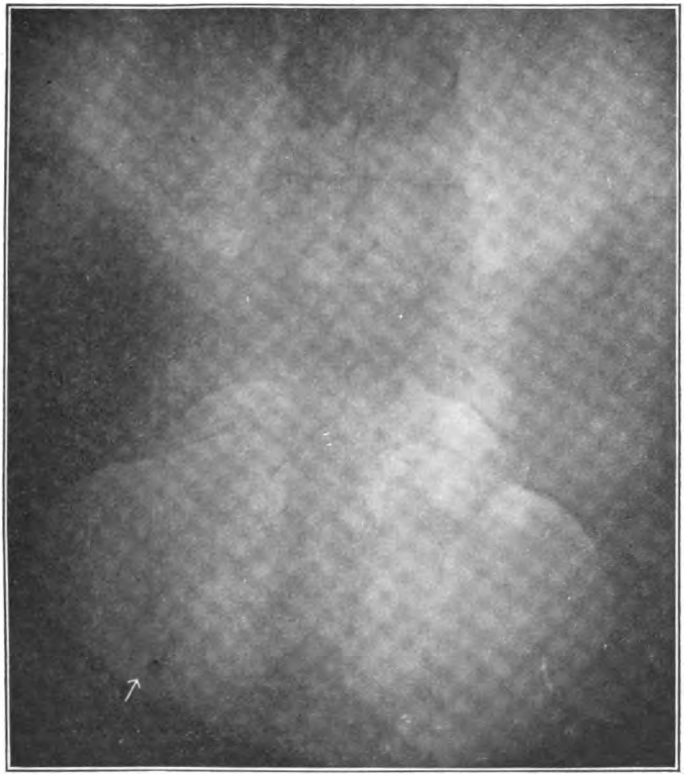

FIG. 10.

right side and one on left. The innermost shadow on the right side was found on operation to be a stone, the other three on the same side, and the one on the left, were the remnants of a bismuth meal in the colon.

The diagnosis of calculi on *x*-ray plates is especially difficult when they are located in the lower third of the ureter and 70 per cent. of the ureteral stones are found there in the neighborhood of the pelvic veins. The difficulty in diagnosis of these stones is

due chiefly to the phleboliths so frequently met there in these pelvic veins. In at least 25 per cent. of all the Western Pennsylvania Hospital pelvic radiograms, examined by the writer, phleboliths were found. Theoretically, there should be no difficulty in distinguishing phleboliths from ureteral stones, but practically it is

FIG. 11.

not always so easy. White plates Nos. 7, 8 and 9 show unquestionable shadows of phleboliths, we cannot be certain of. Calcified glands and foreign bodies in feces may show such shadows. Even a ureteral inflammatory infiltration may give a shadow resembling that of a calculus. In one of the writer's cases referred to him by Dr. G. Feldstein, a round, small body was found in the lower

portion of the right ureter, causing an obstruction with accompanied pyonephrosis. The history suggested a periureteral and ureteral infiltration, but the radiogram, which was unfortunately lost, gave such a perfect picture of a big ureteral calculus, that a diagnosis of ureteral lithiasis was made by the röntgenologist in spite of the history. An incision into the ureter through the vaginal wall demonstrated the thickly infiltrated hard ureteral wall.

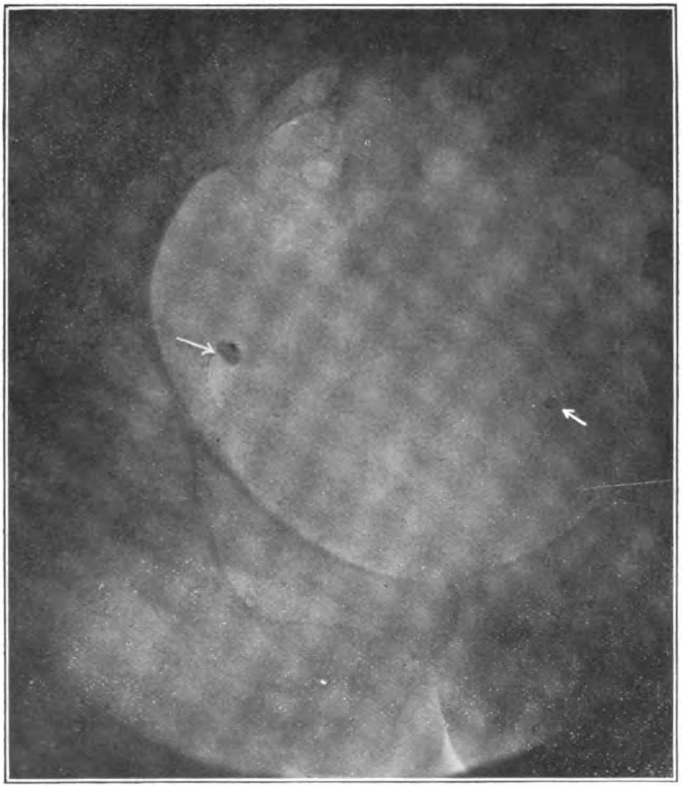

FIG. 12.

In general, a statement can be made that the information given by an *x*-ray plate in renal and ureteral lithiasis is frequently uncertain. Anything, therefore, that can show on the *x*-ray plate the relation of the shadows to the lumen of the ureter can assist us in correctly interpreting these shadows. A renal catheter opaque to the *x*-ray, passed into the kidney pelvis and radiographed, can define this relative position of the ureter and renal pelvis to the stone.

The catheter used for this purpose is either a styletted one (lead or fine silver wire being used in it), as in plate 13, or a specially manufactured one for *x*-ray purposes as in plate 14. The *x*-ray catheter gives a heavier shadow, and, at the same time, allows a freer flow of urine; the styletted catheter gives a better picture of the ureteral stone because the catheter material, being transparent to the *x*-rays,

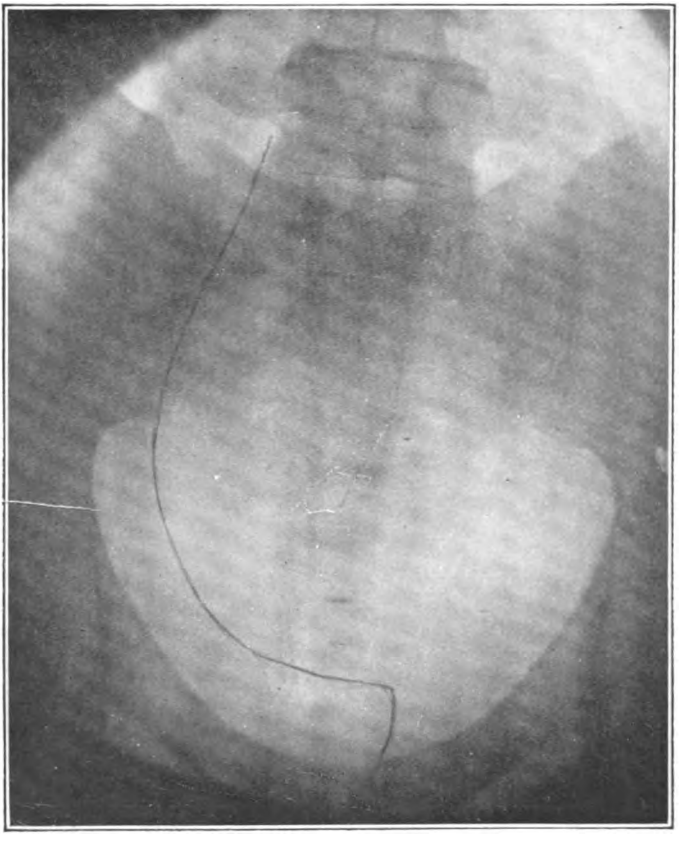

FIG. 13.

leaves a clear space of the thickness of its wall between the shadow of the wire and that of the stone. But whichever catheter is used, when a shadow resembling a stone is seen on an *x*-ray plate along side the shadow of the catheter, a positive diagnosis of stone can be made.

The plate No. 15 shows a shadow of a ureteral stone in immediate proximity of an *x*-ray catheter. The stone is small, and if it was

not for its contact with the catheter shadow, the diagnosis of stone could hardly have been made.

The value of such findings will be especially appreciated when we bear in mind the fact that not infrequently the symptomatology of a ureteral calculus is not definite, that usually the pain is irregular and vague; that not infrequently the pain is reflected to the opposite

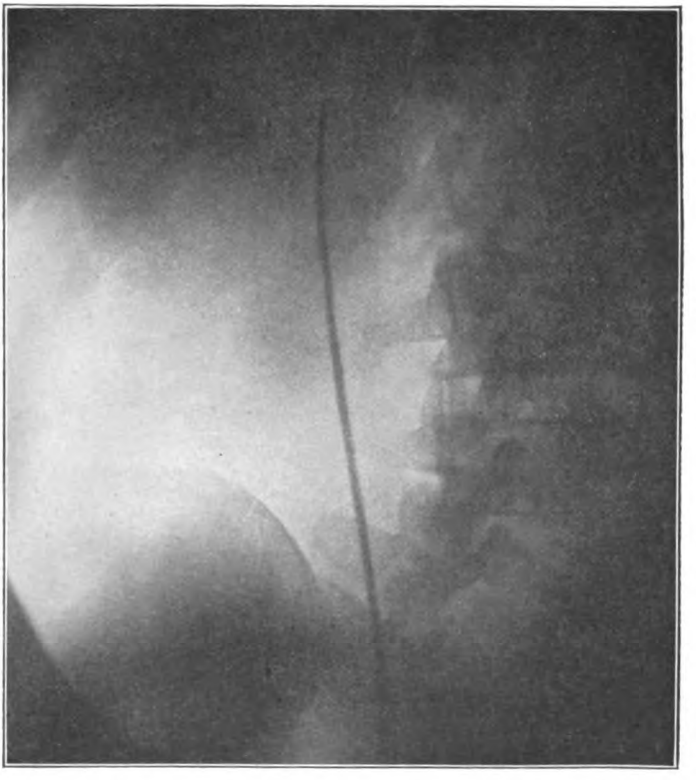

FIG. 14.

side, and that the disturbances caused by ureteral calculi may be mistaken for those of appendicitis, tuboovarian disease, gall-bladder disease, etc.

SHADOWS OF PELVIS AND URETER OBTAINED BY PYELOGRAPHY AND URETEROGRAPHY.

A catheter opaque to the *x*-ray, while locating the renal pelvis, cannot give us its size or shape. But there is frequently a great need for such information, especially when we have under consideration

the question of a radical operation on kidneys. Such information can be supplied only by pyelography, *i.e.*, radiography of renal pelvis dilated to its capacity by fluid opaque to the *x*-rays. The

FIG. 15.

fluid generally used is a collargol solution (5 per cent.–10 per cent.) because it is astringent, antiseptic, and nonirritating, and because its color enables us to observe through a cystoscope its return flow

into the bladder. To obtain a pyelogram, a catheter is passed into the renal pelvis. The writer uses 1-ounce-soft-rubber bulb syringe which is filled with the collargol solution and into which is inserted a dull hypodermic needle. The point of this needle is connected with the renal catheter. (Fig. XVI.) By making moderate pressure on the bulb, the fluid is slowly forced into the pelvis of kidney until the patient experiences pain, or the fluid begins to flow into the bladder.

While injecting the collargol care must be taken not to use any violent force.

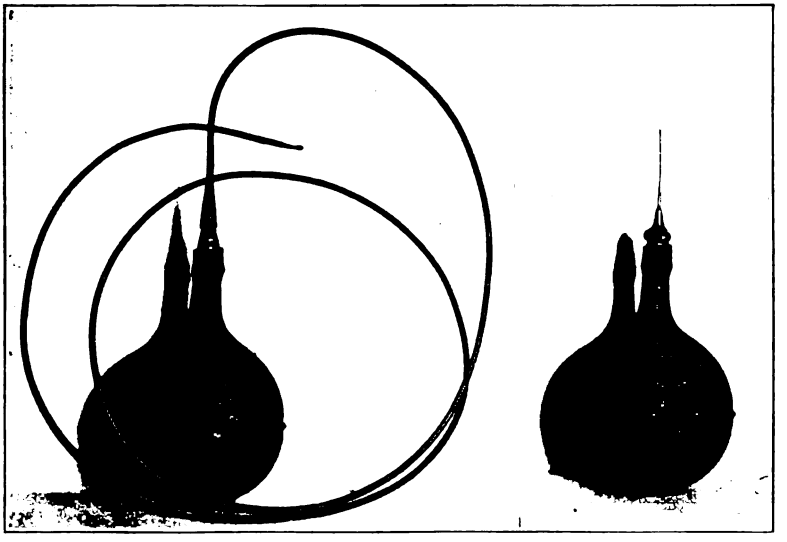

FIG. 16.

A number of authors have observed eroded and necrotic areas in the pelvis as well as discolored and ruptured tubules from the careless distention of the renal pelvis. When the solution is injected in proper amount and under proper pressure, no such injury to the kidney or pelvis should occur. The careful experiments of Strassman on rabbits have proven this.

As soon as the renal pelvis is distended to its full capacity a pyelogram is taken. The picture thus obtained shows the size of the pelvis (dilated, contracted or normal), its form (shape of the pelvis and its calices) and position (horseshoe kidney or displaced kidney). In the hands of a good radiographer the picture of the renal pelvis is correct, clear and well defined. Of course, the irri-

table and relaxed kidneys referred to above will occasionally give a misleading pyelogram to the most skillful röntgenologist.

The value of pyelograms is mostly appreciated when it is desirable to obtain an idea about the extent of an operation to be undertaken for a badly diseased kidney. In slide No. 17, we see a large stone in the pelvis of the kidney. There was pus in the urine, but the patient was not complaining much of the kidney. In such a case

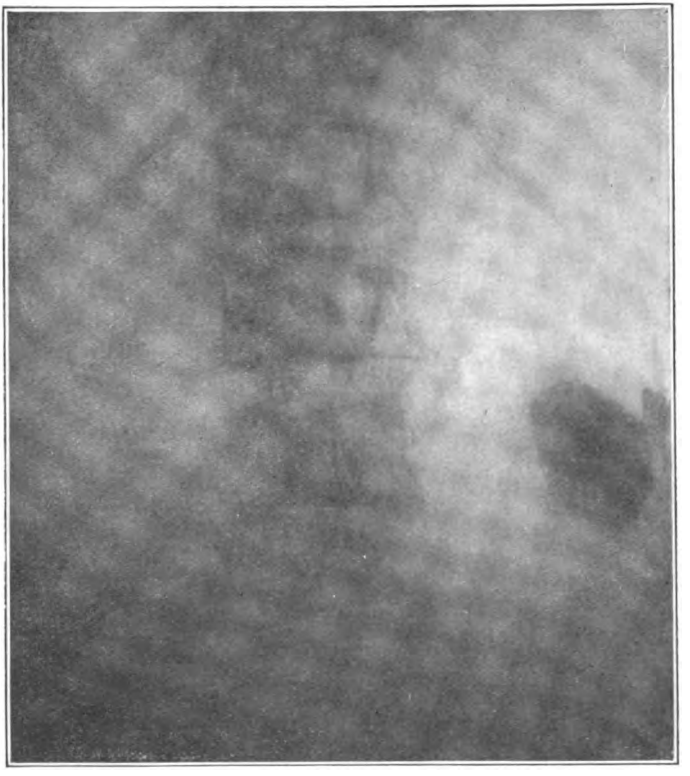

FIG. 17.

nephrotomy may be promised, but No. 18, pyelogram of this same patient, shows a very much dilated pelvis with a dilated ureter and with such findings a radical operation must be preferred. The value of a pyelogram is very frequently greatly enhanced by the ureterogram (the shadow of the renal catheter carrying the collargol to the pelvis.) This shadow frequently shows abnormalities of the ureter that a styletted or *x*-ray catheter cannot demonstrate, such

as dilated or contracted ureters, ureteral kinks, high insertion of the ureter into the pelvis. Thus we can by taking a ureterogram with a pyelogram find not only the pathological condition of the pelvis, but find the cause of the difficulties and gain helpful hints for the proper surgical procedures. The following plates bring out clearly this point.

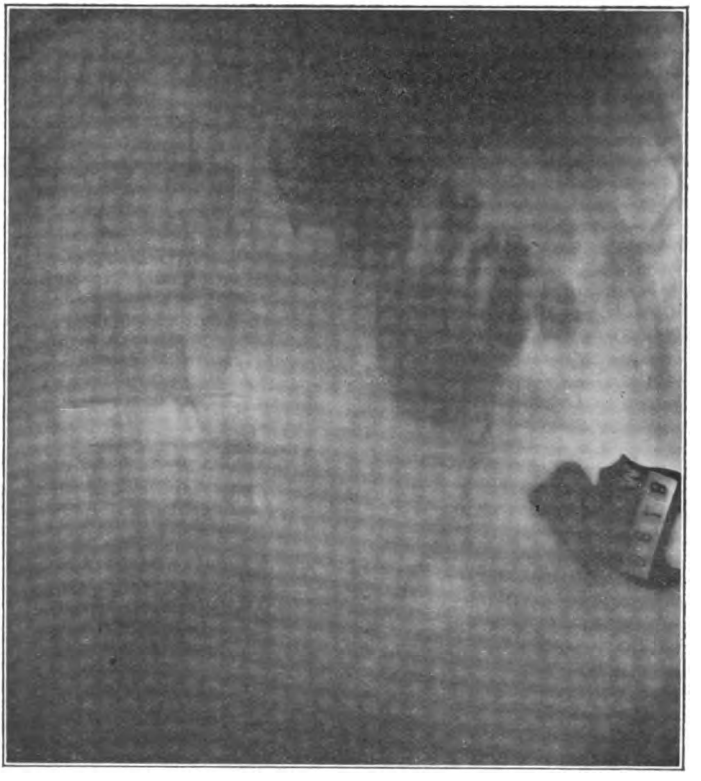

FIG. 18.

Plate No. 19 shows a catheter that met an obstruction in the ureter. The character of the flow of the urine indicated the presence of the catheter in the ureter.

Plate No. 20 shows the pyelogram of the same patient. The pelvis is found dilated. The ureter is shown kinked at the entrance into the pelvis. This picture then shows the pathology and etiology of the abnormal kidney and clearly outlines the character of the operation.

Plate No. 21 showing an *x*-ray catheter passed into ureter to a point near the renal pelvis. It could not be forced up higher and the flow of urine indicated that it had not reached the pelvis. Number 22 is a pyelogram of the same patient and shows the dilated pelvis and also a dilated ureter above the seat of stricture. The cause, therefore, of the pelvic dilation in this case is the stricture of the ureter at its upper third. Thus the diagnosis is clear

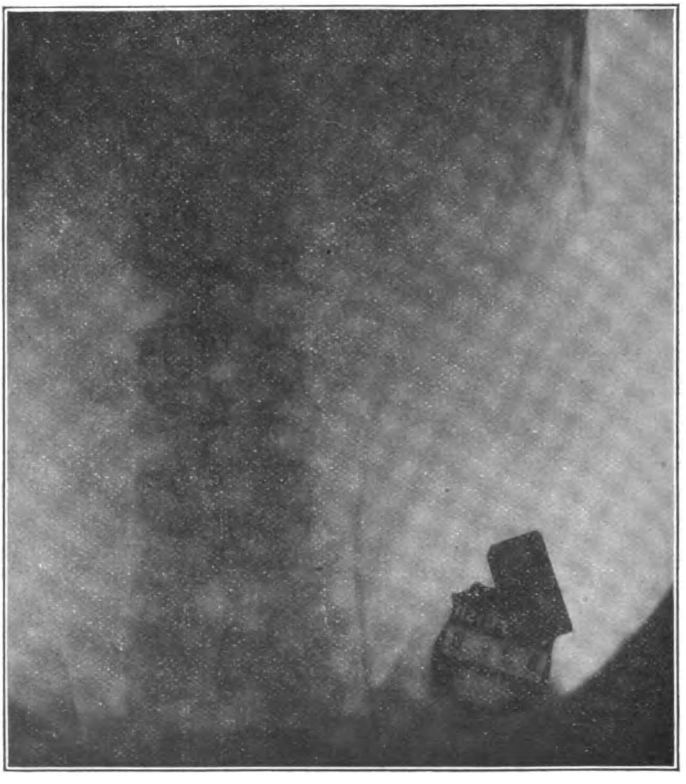

FIG. 19.

and treatment in this case, as in the preceding one, is clearly indicated by the ureteropyelogram.

Plate No. 23 shows a large loop of a renal catheter in the pelvis turned downward, indicating a high insertion of the ureter into the pelvis; and plate No. 24 of the same patient shows a dilated pelvis with its dilated calices below the insertion of the ureter. The high insertion of the ureter, interfering with the complete emptying of

the renal pelvis, is responsible for urinary retention (residual urine) and pelvic dilatation. Plate No. 25 is a similar pyelogram of another patient.

These plates fully explain the pathology of the kidney and plainly outline its surgical treatment.

FIG. 20.

THERAPEUTIC VALUE OF THE CATHETER.

So much for the diagnostic value of the ureteral catheter. But the catheter has also a great therapeutic value. By its aid we can frequently relieve ureteral obstructions, facilitate certain operative procedures, establish kidney drainage and conduct renal lavage and treatment.

RELIEF OF URETERAL OBSTRUCTION.

The greatest value of the ureteral catheter is seen in the treatment of ureteral obstruction. The obstruction caused by the

changes within the walls of the ureter, by pressure on the walls from without and by foreign bodies within the ureteral lumen, can either be permanently cured or temporarily relieved by the catheter. The most common form of obstruction caused by changes within the ureteral walls are, in our experience, the strictures, and the renal catheters or bougies are the best instruments for their dilation. The attempt to dilate a stricture in the upper third of the ureter may

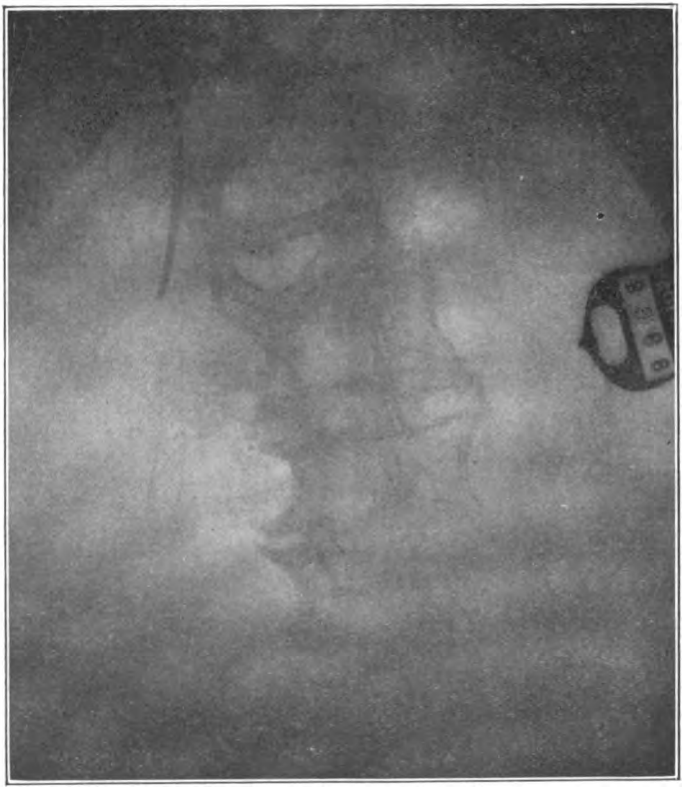

FIG. 21.

not be successful and may even be dangerous in the hands of an unskilled cystoscopist. But ureteral structures are very rarely found there. They are usually met in the lower third of the ureter, where they develop as a result of ascending infections from the bladder or as a result of pelvic inflammations in the surrounding tissues. The strictures in this location can be very safely dilated by successive sizes of catheters or bougies.

The obstructions in the upper portion of the ureter are most commonly caused by kinks, twists, diverticula and valves. There is not, as a rule, much difficulty met by the catheter in passing these obstructions from below up. The injurious effects, therefore, caused by such modes of obstructions can be easily relieved by draining the dilated ureter and pelvis through the renal catheter, although the

FIG. 22.

permanent correction of the obstruction cannot be carried out by the catheter.

The same holds good in a case of an obstruction of the ureter caused by pressure from without (exudates, tumors, pregnant uterus, anomalous vessels, etc.) While the cause of obstruction cannot be removed by the catheter, the relief obtained by ureteral catheterization is very great. By relieving the dilatation of the ureter and pelvis of kidney (emptying the urine or pus) we can keep the organ in good condition until the cause of the obstruction is relieved by

operation (tumor or exudate), absorption (exudate) or delivery (pregnancy). The relief, thus obtained, is frequently most striking; it is especially so in the infected dilated kidneys of pregnancy.

The use of the catheter in obstruction caused by foreign bodies within the lumen of the ureter is of still greater value. A calculus descending in the ureter and grasped by the musculature in a posi-

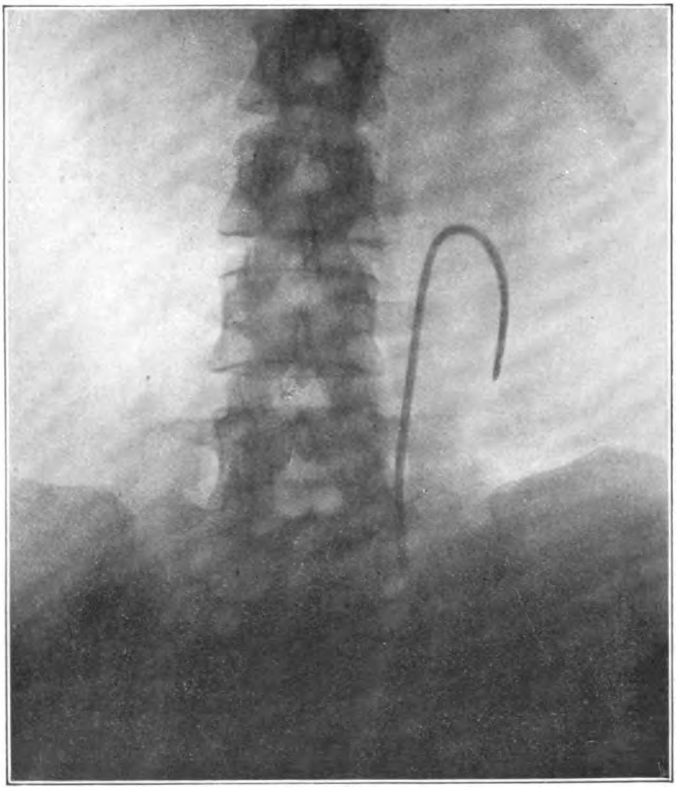

FIG. 23.

tion unfavorable for its passage may be helped in its descent by the catheter. The catheter is passed to the point of obstruction and a solution of cocain is injected to relax the ureteral wall, and then sterile olive oil is gently forced into the catheter to dilate the ureteral lumen. Such dilation may change the position of the stone to a more favorable one for its descent. Occasionally the withdrawal of the catheter passed above the seat of the stone will carry the stone down into the bladder. This result of catheterization was

obtained by the writer in a case of ureteral stone referred to him by Dr. J. N. Stanton. This patient was admitted for renal colic. An *x*-ray catheter was passed into the renal pelvis and radiogram taken. The stone was found on the plate lying about 3 inches above the ostium. On the removal of the catheter the stone was carried into the bladder.

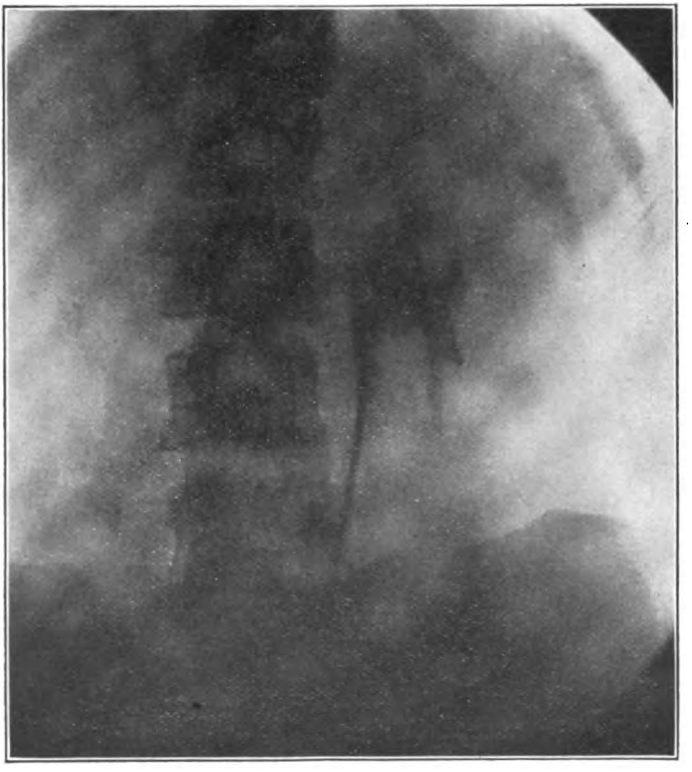

FIG. 24.

The other foreign bodies in the ureteral lumen, easily removed by catheter, are pus clots, blood clots and accumulations of urinary crystals. These obstructions are exceedingly interesting for the ease with which the relief is brought to the patient by catheterization. The catheter forced through the obstructions breaks up easily the obstructing material which is then carried off in small particles by the catheter or by the ureter after removal of the catheter. It might not be out of place here to cite briefly three cases, one for each of the three kinds of foreign-body obstructions mentioned.

Mrs. E. W. H., a case of bilateral tuboovarian infection with extensive adhesions, referred by Dr. J. W. Boyce, Dec. 22, 1903, for bilateral salpingo-oophorectomy. The patient had pyuria before operation. On the third day after operation both kidneys were found very much enlarged. The patient then began to suffer with pain in both kidneys and with an intermittent anuria (bilat-

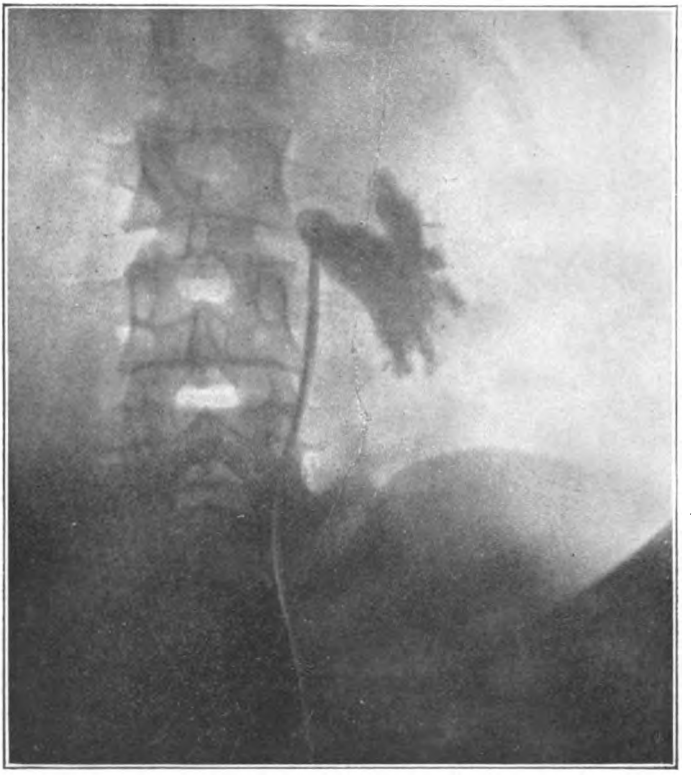

FIG. 25.

eral pyonephrosis). The left kidney soon improved, while the right one continually annoyed her. Catheterization of the kidneys was recommended by the writer, but it was not agreed to. Five months after the operation the patient became semiconscious and remained in this condition for about a week. Eight months after operation, while still in hospital, catheterization was consented to. The catheter found the obstruction in the lower third of the right ureter, which, after considerable manipulations, was passed. A purulent urine, with pieces of clotted pus came through the

catheter with immediate relief. The patient left the hospital the following week. Within two years after the discharge from the hospital she had to be catheterized twice for the same obstruction by pus clot. The patient was seen by the writer about eight months ago, eight years after the last catheterization. She never had attacks since the last treatment, is perfectly well, and her urine is normal.

Miss McC., twenty-four years, referred by Dr. F. Morgan, Braddock, April 24, 1905. She had five attacks of renal colic within three days, beginning in the right lumbar region and shooting toward the bladder. Morphine gave no relief. The patient gave a history of a similar attack on the left side four years before. Nephrolithiasis was suspected. The right ureter was catheterized and found obstructed. The left ureter was catheterized, but no urine was obtained for eight hours (sympathetic anuria.) After the left kidney began to secrete urine a number of attempts were made to pass the obstruction in the right ureter. A small-sized catheter was finally passed through the obstruction. A free flow of urine with small pieces of black clotted blood passed through it. Immediate relief followed. The writer saw her at his office three months ago. She never had an attack since the catheterization.

Mrs. R. B., Blairsville, Ohio, patient of Dr. L. S. Clagget, seen August 1, 1906. She gave a history of frequent left-sided pelvic pain of seven years standing. They were colicky in nature, lasting two to six hours at a time. The pain came once or twice a week. She lost 40 pounds during the seven years. On examination, the left vaginal portion of the ureter was found thickened and hard. A catheter could not be passed. The lower stenosed ureteral portion was dilated with successive sizes of bougies. With a small catheter the obstruction was then passed. Clear urine came freely from the catheter and with it a pure white phosphatic sediment. The base of bladder was found strewn with the same clear white gravel. Immediate relief followed. While the phosphatic sediment accumulations caused the patient's attacks of pain, it is questionable whether this sediment could have caused the obstruction in a normal ureter. After the dilation of the ureter the patient's attacks stopped. The patient was seen by the author two years ago. She was in perfect health.

FACILITATES OPERATIVE PROCEDURES.

The ureteral catheter is frequently made use of in operative surgical procedures, as a safety guide for the ureter.

During operations on pelvic organs necessitating wide dissections,

such as in cases of carcinoma of the uterus, broad ligament tumors and exudates, the catheter clearly outlines the ureters, thus protecting them from injury. Many an injury to the ureters could be avoided if this precaution of a preliminary insertion of catheter had been practised. This precaution is especially valuable in cases of dislocated ureters.

In operating on injured ureters the renal catheter assists in discovery of the injuries and facilitates their correction. In case of ligated or cut ureter the catheter exposes for us the lower part of the ureter and greatly facilitates the approximation of parts.

RENAL DRAINAGE FOR FISTULA.

A great assistance is rendered by the catheter in closing a renal fistula. It may be kept in the renal pelvis for days, thus establishing urinary drainage in natural direction, and promoting the closure of the fistula.

RENAL LAVAGE AND MEDICATION.

In some diseases of the renal pelvis the catheter can be used with excellent results for renal lavage. The catheter is inserted into the renal pelvis and solutions such as boric acid, silver nitrate, argyrol or collargol are injected. Such lavage can be used in chronic ascending catarrhal pyelitis, especially of gonococcus or colon bacillus origin.

In case of hydronephrosis the fluid can be gradually drawn off and in pyonephrosis, by the aid of the catheter we may drain off the pus and treat the pelvis with antiseptic solutions. Such treatment in favorable cases of hydronephrosis or pyonephrosis is frequently followed by a complete cure. In unfavorable cases, the patient's general condition can be greatly improved preliminary to operative procedures.

Even in renal hemorrhages the catheter has been put to good service. Cases have been reported in which adrenalin injection arrested such hemorrhages. Of course, the cause of hemorrhage should, if possible, be investigated before such treatment is undertaken.

We see, then, that the value of the ureteral catheter in diagnosis and treatment of urological disease is well established. It behooves us all to make use of it more frequently than it has been our custom in the past. To some of us ureteral catheterization seems a difficult

procedure; to others a dangerous one. It should be neither dangerous nor difficult in the hands of men practising the surgery that we do. Those of us who have catheterized thousands of ureters have learned not to fear infection from its use, and have gradually extended the field of its application with great satisfaction to themselves and great benefit to their patients.

RENAL AND URETERAL CALCULI.

BY

HENRY DAWSON FURNISS, M. D.,

New York City.

(With Fifteen Illustrations.)

I shall first present histories of my cases, then an analysis, and finally my conclusions.

CASE I.—Referred by Dr. Guion of New Rochelle; thirty-four years old, seen first on December 6, 1912. Has had four children, the last born August, 1912. Since the birth of this child she has had some backache and difficulty in walking. In the middle of November, 1912, she noticed that her urine was of a port wine color for eight days from admixture of blood. This cleared and was noticed again on December 3, though not so much as before. When seen by me there was no blood in the urine and cystoscopy failed to show any vesical cause for hemorrhage and the ureters appeared normal.

In October, 1912, she had severe pain in abdomen and back for eighteen hours, but no more on one side than the other.

Radiograms of the urinary tract show a medium-sized stone in one of the lower calices of the left kidney. Unless the pain in October was due to the calculus, this patient had only her hematuria to call attention to the presence of trouble.

I advised that the size of the stone be determined from time to time radiographically, and that unless there was an increase, or more hematuria or other troublesome symptoms, that she be not operated (Fig. 1).

CASE II.—Referred by Dr. K. K. McAlpine, of New York.

Seen first on April 11, 1911. For several years this patient had been suffering from pain in the left renal region, which was relieved by the recumbent posture, to return when up and about. The urine contained a small amount of pus and blood. Radiographs showed the shadow of a small round calculus, which at operation proved to be in the renal pelvis. This was removed by incision in the pelvis posteriorly. The pelvis was closed with fine catgut suture and there was no leakage afterward. There has been no trouble since the operation. This small stone, situated as it was and ball-

valving the ureter when the patient was erect, caused a great deal of distress (Fig. 2).

CASE III.—Referred by Dr. John Van Doren Young of New York. Seen first October 27, 1911. Aged thirty-eight. In October, 1910, had severe pain in the left side of abdomen just within and below anterior superior spinous process; this was preceded for twenty-

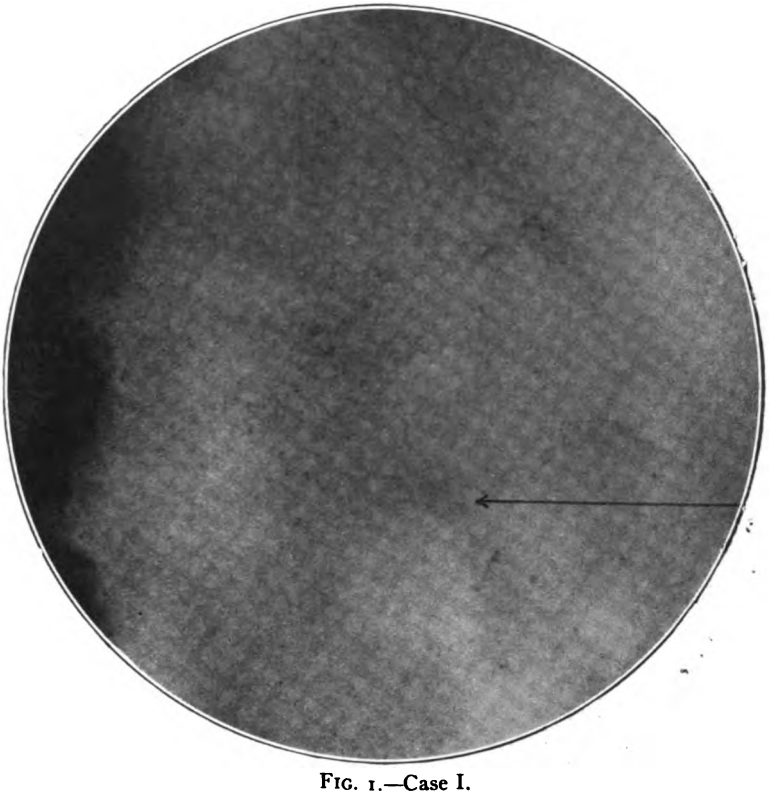

FIG. 1.—Case I.

four hours by some soreness in this region. The pain lasted four hours and morphine by hypodermatic was necessary for relief. There was no further trouble until October 18, 1911, when there was severe pain for twelve hours; there has been much soreness since. Shortly after the first attack it was noticed that the urine was turbid. It showed a moderate amount of pus.

Radiographs showed a branched stone in the left kidney, the projection going upward into one of the calices (Fig. 3).

On November 3, 1911, I removed the stone through an incision

in the posterior aspect of the pelvis, which was sutured. For forty-eight hours urinary drainage was considerable, very little in the third twenty-four, and after that none. Patient made an uneventful recovery and has had no further trouble.

This patient had a rather large calculus which had evidently been present for some time. The pain was always over the middle por-

FIG. 2.—Case II.

tion of the ureter, yet there was no history of the passage of portions of the calculus, nor were any found radiographically.

CASE IV.—Referred by Dr. D. W. Cairns of New York. Seen first on March 4, 1906.

In 1898 noticed for the first time that the urine was turbid; this has persisted until the present. In 1903 passed an oblong, hard stone, which was quite rough. Had been suffering much with colicky pain in the right renal region for six years previously. Since the passage of the stone has had pain in that side, but no colics.

Both ureters were catheterized, and purulent urine obtained from the right. Lavage of the renal pelvis helped, but did not clear up the pyuria. Radiography showed a calculus in the right kidney. Patient refused operation and was lost sight of. When seen by me, this patient complained of only moderate discomfort and pyuria.

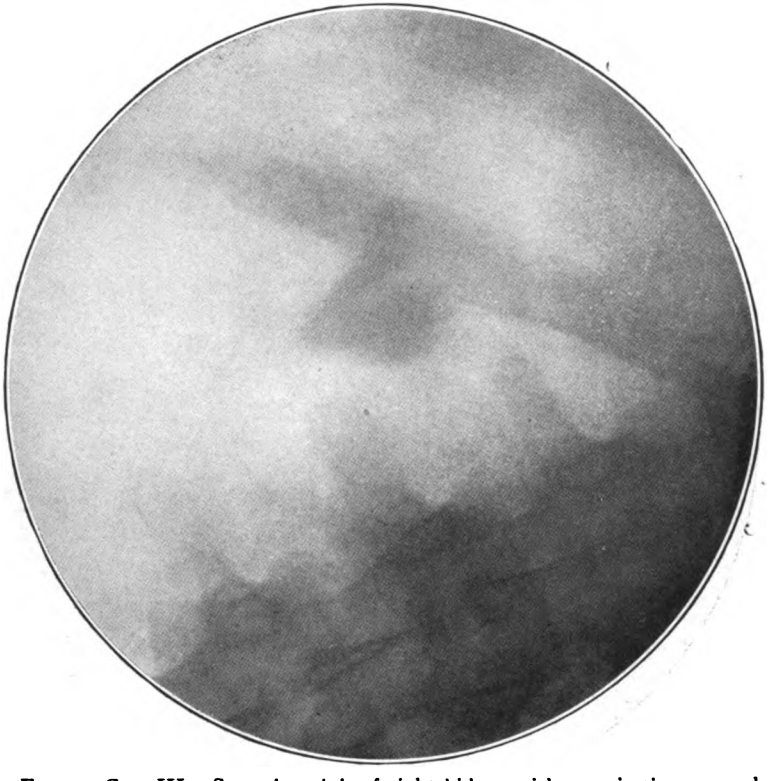

FIG. 3.—Case III. Stone in pelvis of right kidney with a projection upward into a calyx.

CASE V.—Referred by Dr. Edward Quintard, of New York. This patient was first seen in June, 1909, on account of pyuria. She was forty years old, a widow, who had never had any children. In 1900 her maid told her that the urine in her chamber was turbid and suggested that it be examined. It was found to contain a large amount of pus. She had no frequency of urination. She had for a short time only mild pain in the lumbar region, no more marked on one side than the other. Was treated for years with bladder irrigations without benefit. Radiographs showed four large stones in the region of the left kidney. At operation it was found that the

kidney was the size of a grape fruit, with very little renal tissue left. Nepherotomy.

This patient had four enormous stones in the left kidney that had practically destroyed it, and the only symptom of which she had complained was pyuria, and this did not bother her other than by the knowledge of its presence.

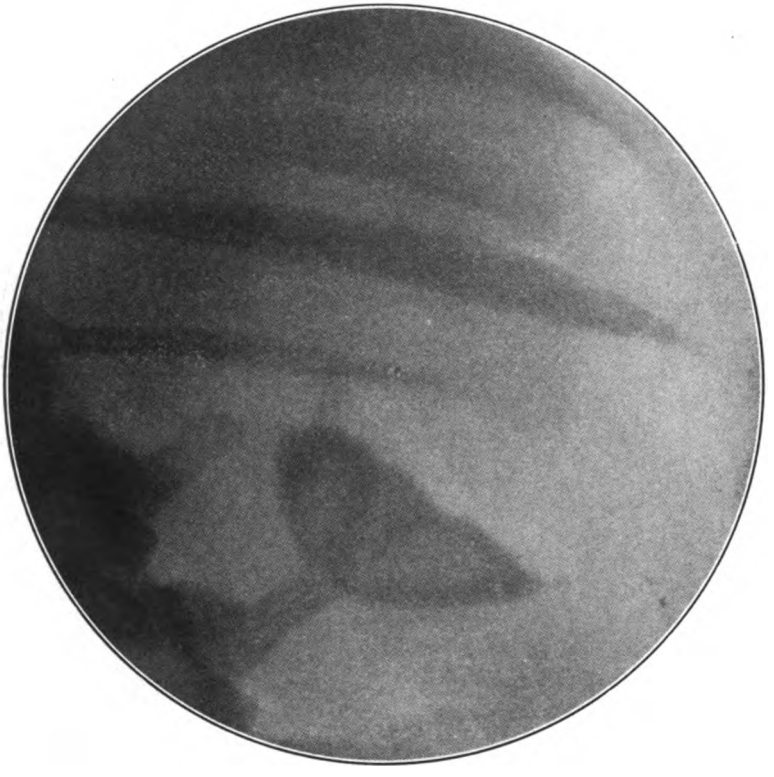

FIG. 4.—Case IV. Two stones in right renal pelvis.

CASE VI.—Referred by Dr. Guion, of New Rochelle. This patient had some pain in the left renal region for a short time after the birth of her only child in 1895. Since 1907 she had had attacks of pain in the left renal region, associated with temperature, nausea and vomiting. These have come on several times a year, the last one starting April 23 and persisting for five days. During this time she had frequency of urination and noticed some blood and pus in the urine. In Feb., 1912, she passed some gravel.

When seen by me she was having pain in the left renal region and

had a temperature of 101°. Examination of the bladder urine showed a large amount of blood and many pus cells. Cystoscopy revealed a mild cystitis. Through ureteral catheters urine was obtained. That from the left showed a small amount of pus and 0.6 per cent. albumin, no elimination of phenolsulphonephthalein after one hour's observation. That from the right showed a small amount of pus, much blood and 0.2 per cent. albumin, and 28 per cent. phenolsulphonephthalein in one hour.

Radiographs showed two large stones in the pelvis of the right kidney (Fig. 4). Because of the symptoms referable to the left side and the low phenolsulphonaphthalein output another catheterization of the left ureter to the renal pelvis was done and 10 ounces of urine collected in a steady flow.

The stones in the right kidney were removed by posterior pelviotomy and the pelvis was not sutured. There was drainage for seventy-two hours, during which time 12 ounces of urine in twenty-four hours was collected. After the cessation of the drainage 80 to 90 ounces were obtained from the bladder in each twenty-four hours. For the first three days after operation there was excessive thirst and vomiting. On the fourth day she became irrational, more so on the fifth, and died on the sixth from renal insufficiency.

Here is a case where the presence of shadows of stone in the right kidney with a history of left pain might have led one to suppose that the pain was of reflex origin. Had it not been for the low output of phenolsulphonephthalein that made me make another examination, I might have overlooked the 10-ounce hydronephrosis. In this case my plan of treatment was to put the right kidney in good condition and afterward to remove the left.

CASE VII.—Referred by Dr. Guion, of New Rochelle. Seen first in January, 1913. Since 1900 has had some frequency of urination and gets up three or four times at night to pass urine.

In November, 1912, after lifting a heavy chair, she had sudden acute pain of a few minutes' duration in the right renal region. That night there was a chill and rise of temperature, the temperature lasting a few days. In December she had temperature for several days, but with no pain.

Patient never noticed turbidity of the urine until she had an attack of quinsy in January, 1912, when her physician discovered much pus.

Except for a slight trigonitis, the examination of the bladder is negative. The urine from the left kidney is clear; that from the right contains a large amount of pus from which colon bacilli were isolated

in pure culture. The ureteral catheter is obstructed at 9 inches. Radiographs show two large calculi, end to end, the lower extending down into the ureter and the upper into the upper calices of the kidney. There are shadows of several smaller stones scattered through the calices (Fig. 5).

Indigo-carmine injected intramuscularly appears strong from the left kidney in twelve minutes, the interval between spurts being thirty seconds and the ejection lasting five seconds. On the right

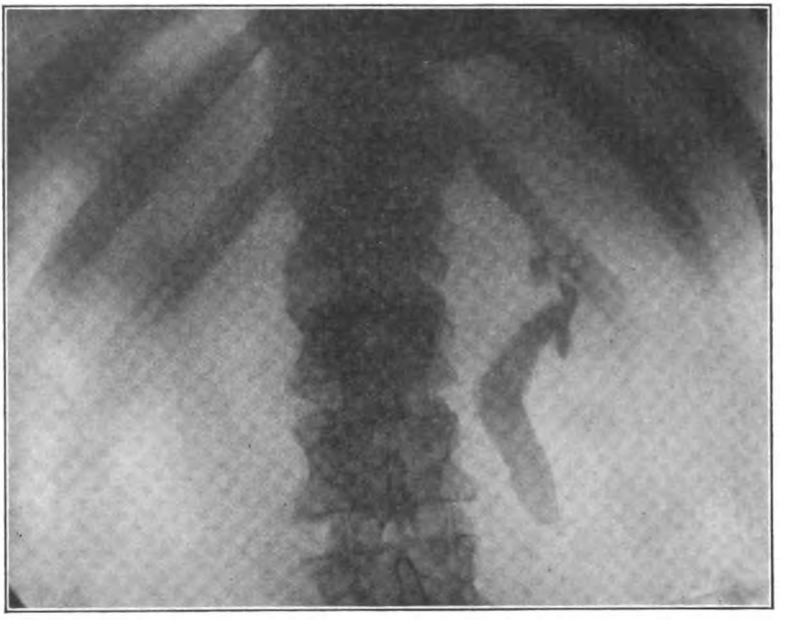

FIG. 5.—Case VII.

it appeared in the same time but only faintly; on this side the spurts were without vigor, but lasted fifty seconds with ten seconds interval.

On January 17, 1913, I cut down on the right kidney, which was slightly prolapsed, and only slightly enlarged. The adhesions were not marked. As the kidney appeared to contain a large amount of normal appearing tissue, I removed the two large stones through the posterior incision in the pelvis, and several of the smaller ones by incisions in the cortex. The pelvis was not sutured. Urinary leakage for only seventy-two hours.

The patient made a good recovery, but within two months after operation passed three stones, and continued to have her pyuria.

Since operation she has had some pain in the right renal region, and as the pyuria persisted and the functional capacity of that side has not improved, I advised nephrectomy. She went to someone else with less radical views and I lost sight of her.

Surely these calculi have persisted for a long time and yet there was only one attack of pain. The pyuria, which was also probably of long duration, was not noticed until it was found in a routine examination by her physician.

FIG. 6.—Case VIII. Large stone forming cast of right renal pelvis.

CASE VIII.—In December, 1905, I saw this patient for the first time. She was then forty-one years old. Right after the birth of her only child, twenty-two years previously, she had some burning and difficult urination. An examination at this time revealed a small growth at the urethral orifice. This has continued to increase in size. In 1890 she began to have frequent and burning urination, and some difficulty in passing water, all of which became worse after

1900. Since 1904 she has frequently an imperative desire to void urine, but it is often some time before she is able to pass it. She claims that she has had pain in the right lumbar region since 1897.

When I first saw her there was a small growth to the right and below the urethra, the nature of which was not determined, that caused difficulty in passing the cystoscope. She had a mild chronic cystitis and purulent urine coming from both kidneys. On the right side I was able to obtain a scratch mark on the catheter on two occasions, and it was judged that at the time she had a calculus in the upper end of the right ureter. She refused to be radiographed.

I saw her again in June of this year, and she is in just the same condition as when first examined. When taking urotropin she is able to keep down the amount of pus and feels well. Has never had any attacks of renal colic. It is probable that she has calculi in both kidneys, and surely in the right ureter.

CASE IX.—Nurse. Seen first February 1, 1913; thirty-seven years old. Had been in good health until the beginning of the present trouble which started in 1907. At that time she was taken with severe pain in the left renal region and inability to void urine. Had temperature and was sick for two weeks. In 1908 she had a similar attack, but this time the pain was in the right renal region. After this the attacks came on, at first, every six months, then every three, and later every six weeks, alternating from one side to the other. In these she had vomiting; the pain was much relieved after vomiting; there was also dysuria, but never suppression as in the first attack. In 1910 she was taken very ill; pain, temperature, and bloody and pussy urine. Since then all the attacks have been on the right side. Began to lose weight in 1910, and for the past four or five months has been losing strength.

Examination shows a small, thin, anemic woman. Catheterized bladder urine shows a large amount of pus and some blood. Cystoscopy shows general catarrhal cystitis. Over the base of the bladder, in the bifurcation of the small blood-vessels, are seen small red, round, slightly elevated spots; these are not tubercles. I have seen these in only one other case, and that one of renal calculi. Catheterization of the right ureter done. No drainage from it; a large amount of pus is seen coming down the ureter alongside of it. Urine from the left side shows a moderate amount of pus, and some red blood cells. 0.6 phenolsulphonephthalein injected intravenously did not appear in the bladder until nineteen minutes had passed.

Radiographs.—In each kidney, and forming a cast of the pelvis, is seen a shadow of a large branched calculus (Figs. 6 and 7).

On February 14, 1913, under gas oxygen anesthesia, the right kidney was exposed through an oblique incision, brought into the wound and the large calculus removed through the pelvis posteriorly. The pelvis was almost 1/4 inch in thickness. Catgut closure of the fascia and muscles; silkworm-gut closure of skin. A cigarette drain down to the pelvis. It was my intention to have this drain remain for sixty hours, but in the dressing it was by mis-

FIG. 7.—Case IX. Large stone forming cast of left renal pelvis.

take taken out. There was urinary drainage for seventy-two hours, then cessation. On the tenth day there was some escape of pus and a small amount of urine from the middle of the wound. This persisted for two days, and after that the wound was dry. The patient made a stormy convalescence; there was much nausea and vomiting for six days, and extreme weakness. However, the patient pulled around and was able to go home on the thirty-eighth day after operation. The stone in the left kidney will be left until the patient has regained enough strength to warrant its removal.

Much damage to the kidney function had been done by the long presence of these calculi, and this was well indicated by the marked delay in the beginning of the elimination of the phenolsulphonephthalein. Except for urgent indications, I would not operate on cases showing such a slow elimination. Had I used ether, or had I attempted to do both sides at once, I feel sure that I would have lost my patient.

September 7, 1913. On account of the illness and death of her mother this summer, the patient has put off operation on the other kidney. She has improved much since the operation and has been free from the attacks of pain that she experienced on the left side.

CASE X.—Seen first in July, 1913; thirty years old. She was an Italian from whom we were able to obtain very little history. For three months she had been suffering with pain in the left renal region and had been having chills and temperature. For this length of time the urine had been turbid from the presence of pus. Examination showed a thin anemic, much run-down woman, who had a tumor mass in the region of the left kidney the size of a grape fruit.

Cystoscopy showed a mild general cystitis. Both ureters were catheterized and clear urine obtained from the right, while urine containing a large amount of pus was gotten from the left. Ten cubic centimeters of a 0.3 per cent. indigo-carmine solution was injected intravenously. Strong elimination began on the right in three and a half minutes, while on the left there was none in half an hour. Radiographs showed a stone in the pelvis of the kidney.

In July, through an oblique lumbar incision I cut down on the left kidney, which was densely adherent, and with difficulty removed it. A large vein in the pedicle was torn, and there was profuse hemorrhage, which was not controlled until the patient was practically moribund. She died within a few minutes after being put in bed.

On section the kidney was found to consist of hypernephromatous tumors scattered all over it, extending from the cortex inward. These were found to be filled with miliary abscesses. In the pelvis of the kidney was found an oblong stone half an inch by one quarter.

The hypernephroma and the stone are probably only coincident. The destruction of the renal function was due more to the pyelonephritis than the tumor.

CASE XI.—From the service of Drs. Quintard and Chace of the Post-Graduate Hospital. Seen first January 16, 1913. Has had four children. During her second pregnancy in 1910, she had much pain in the left renal region. While she noticed no blood, the laboratory report showed its presence and that of a small amount of pus.

This pain kept up during the pregnancy and shortly after the delivery she passed two stones from the bladder. After this she felt better until the beginning of 1913, since which time she had had constant pain in the left renal region, pyuria, and hematuria, and has lost much weight and strength. Since the middle of December, 1912, has been having chills and running a high temperature. Von Pirquet positive.

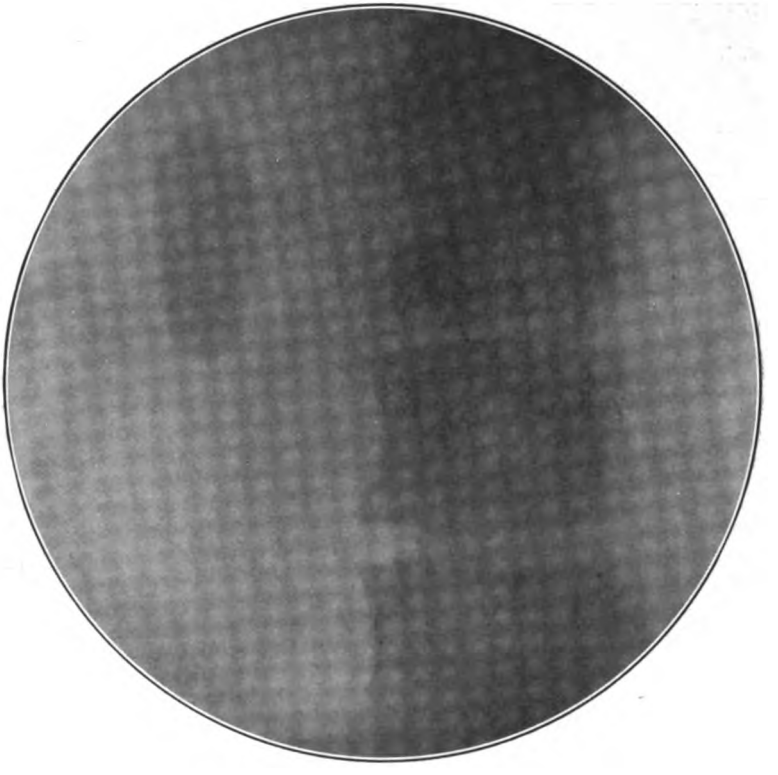

FIG. 8.—Case XI. Large stone in pelvis of left kidney.

January 21, 1913. Patient thin, weak, and shows the effects of septic condition. Bladder holds without discomfort 200 c.c. boric acid solution. General catarrhal cystitis. No urine seen coming from the left kidney. Indigo-carmine injected intramuscularly appears on the right side weakly in nine minutes and strongly in twelve. None eliminated from the left.

January 20, phenolsulphonephthalein in two hours 82 per cent.

February 12, 1913. While in the hospital temperature ranged

from 99.5 to 101°. Radiographs show the shadow of a calculus the size of a pigeon's egg in the pelvis of the left kidney (Fig. 8). The patient went to the country to gain strength before operation and was lost sight of. In this instance the calculus had caused infection and destruction of the kidney and a nephrectomy would have been indicated.

CASE XII.—Referred by Dr. James T. Padgett, of New York.

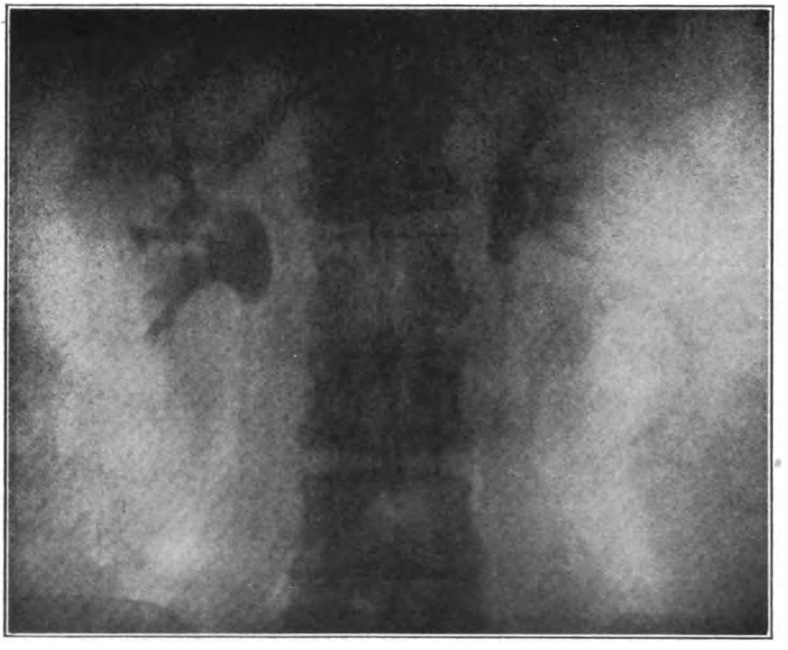

FIG. 9.—Case XII.

Seen first September 25, 1911. Aged fifty-seven. Four children; youngest nineteen. Menopause at fifty-one.

In July, 1902, patient had severe pain in the right lumbar region which radiated down the back of leg, and to the bladder. There was almost incessant urination. The attack lasted two days, the spasms of pain being of seven hours duration with intermissions of three. She passed quantities of gravel that looked like granulated sugar. She had pain along this ureter from then until 1905. In 1905 she had a similar attack, lasting five days, and which terminated by the passage of a small calculus; this attack was on the left side. In 1907, after pain in both kidney regions for two months, she passed a small calculus after six hours of severe pain.

In March, 1911, she had blood in the urine for a short time. Was then radiographed, but no evidence of stone was found.

In March, 1911, she began to have pain over the lower dorsal region, which after a time appeared over the sternum and later over the breasts. These attacks would last from ten to twelve hours, and at first were three weeks apart. Recently the interval has been a week.

On September 26, Dr. Leopold Jaches radiographed her with negative results. I then injected both renal pelves with 50 per cent. argyrol and obtained good radiographs showing normal pelves and ureters (Fig. 9). The elimination of indigo-carmine occurred from both kidneys within seven minutes after intramuscular injection. The urine was negative.

She was free from pain until October 22, 1911, when she had a mild attack. On December 21, 1911, after suffering from Thanksgiving, she passed a small calculus from the left side. She was comfortable until July 4, 1912, when she had pain in the left renal region and after five hours passed about 20 grains of gravel. There was soreness in the left renal region at the time of the report, June 25, 1912.

September, 1913. Since June, 1912, the patient has at times had attacks of pain in the left renal region and has passed two calculi.

The history of the passage of calculi, both before and after radiographs, and the normal pelves, as shown by the pyelographs, lead to two conclusions: that the *x*-ray failed to show stones that were present, or that the kidneys and ureters were free of stones at the time of making the pictures, and that they subsequently formed.

CASE XIII.—Seen first September 3, 1913. Four children, youngest five months old. Has had marked lateral spinal curvature since she was seven years old. When the last baby was three days old she began to have severe pain in the left renal region, with severe headache. This persisted for ten days. Since the middle of this past July she has had pain in the left renal region, which has radiated down the ureter. She came to my clinic the last part of August when I was away, and then it was seen that the left ureter was pouting and markedly edematous. At this time ureteral catheterization was impossible, as the catheter met an obstruction a short distance up the ureter and buckled back. Radiographs then made showed shadows in the pelvis and in the renal region. When I saw her, which was shortly after a particularly severe attack of colic, when she passed several small stones, the ureter was still edematous, but not so much as when she first came to the clinic. Since then the pain has been better and the ureteral orifice on September 13 ap-

peared only slightly reddened. Radiographs made on September 11, show shadows in the ureter just above the sacroiliac joint and several shadows in the kidney. All of these are small, and it is probable that they will pass with little difficulty. If they do not, I shall through a ureteral catheter inject the ureter with glycerin or olive oil, and in this way encourage their expulsion.

CASE XIV.—Seen first on June 1, 1910.

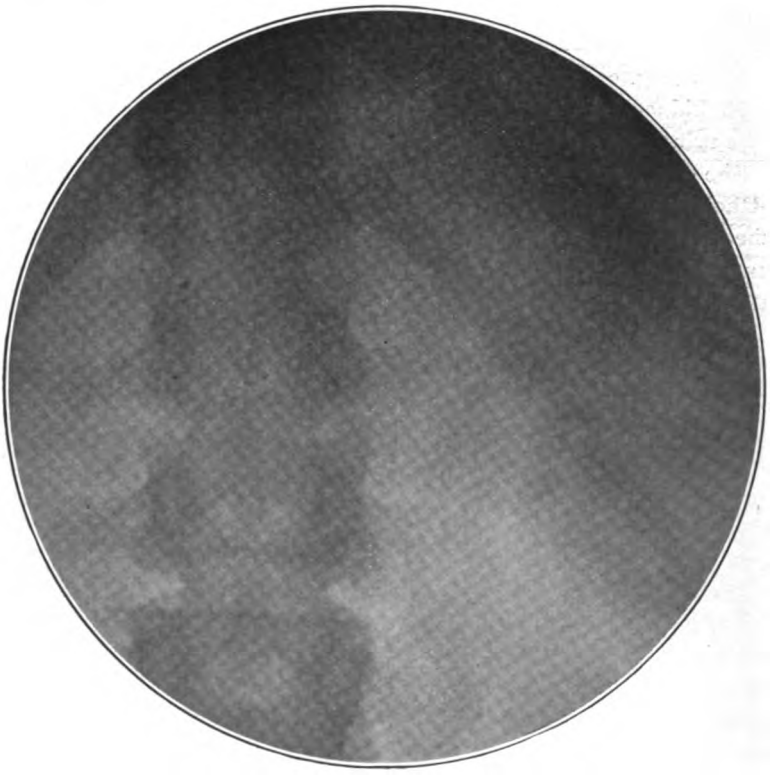

FIG. 10.—Case XIV.

Aged twenty-six; mother of two children, the youngest stillborn, April, 1909. Felt well until November, 1908, when at the fourth month of her last pregnancy she had severe pains in the left lumbar and left inguinal regions, lasting eighteen hours. There was some temperature the following week. Three weeks after the birth of the last child she passed a small oval calculus and another three weeks after this, the only pain being in the urethra as the stone was being expelled from the bladder.

Since April, 1909, she has had some pain in both inguinal and in left lumbar regions.

Since the first of April, 1910, she has noticed some blood in the urine, and it is for that reason that she came to consult me.

Cystoscopic examination of the bladder is negative. The right ureteral catheter is obstructed at 9 inches, and the left at 3 inches. Clear urine from the right, and urine containing a moderate amount of blood from the left.

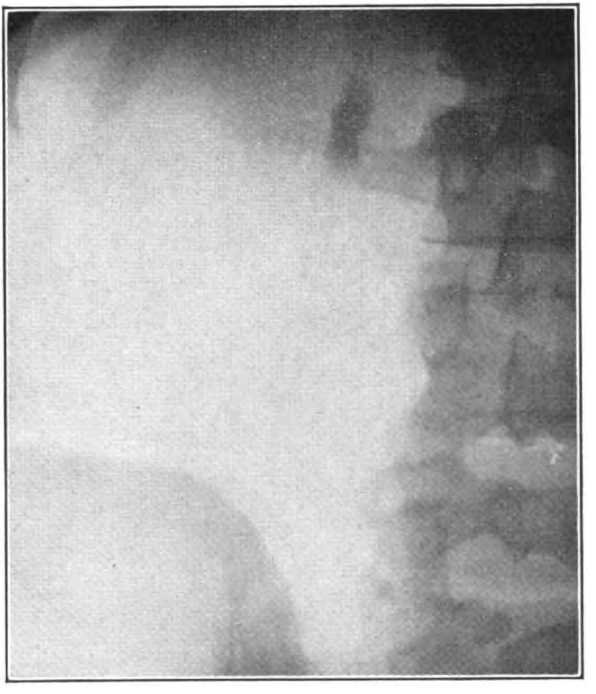

FIG. 11.—Case XIV. Stone in left ureter, opposite transverse process, third lumbar vertebra.

Radiographs show two stones in the calices of the left kidney, stone in the left ureter opposite the transverse process of the third lumbar vertebra, two stones in contact in the pelvic portion of the left ureter; and a stone opposite the transverse process of the third lumbar vertebra in the right ureter (Figs. 10, 11, 12, 13).

While this patient had had one attack of renal colic and had passed two stones, her chief complaint was the hematuria, which, in all probability, was due to the renal calculi in the left kidney. She

became pregnant shortly after the examination and was lost sight of. The multiplicity of the stones is a noteworthy feature in this case.

CASE XV.—Referred by Dr. P. S. Boynton, of New York. Seen first February 6, 1913. Aged fifty-seven years.

In 1898 passed four stones per urethra which, from the history, evidently had their origin in the left kidney.

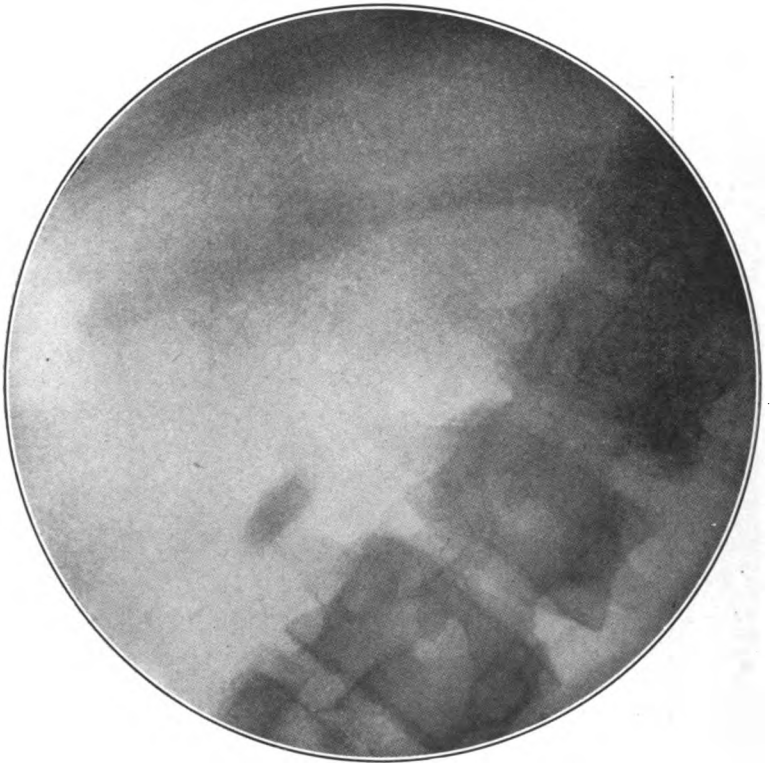

FIG. 12.—Case XIV.

On January 8, 1913, while reading was seized with sudden pain in the left renal region, radiating downward along the ureter, which required a hypodermic injection of morphine for relief. That same afternoon there was another attack. On January 11, another more severe attack, associated with chills and rise of temperature, necessitated patient being in hospital five days. Since then the temperature has ranged from 100 to 101°. Another such attack on January 29. Radiographs show shadows of two stones in the lower pole of the right kidney and one in the lower end of the right ureter. In passing a catheter into the right ureter an obstruction was met at

1 1/2 inches and another at 4, the upper one being the more difficult to pass. Oil was injected above the stone at this time, and on February 8 glycerin, but neither dislodged the calculus.

On February 11, Dr. Boynton removed the stone transperitoneally after milking it to a point opposite the promontory of the sacrum. This stone was the size of a pea, and shaped like an arrow-head. Patient died forty-eight hours after operation from pneumonia.

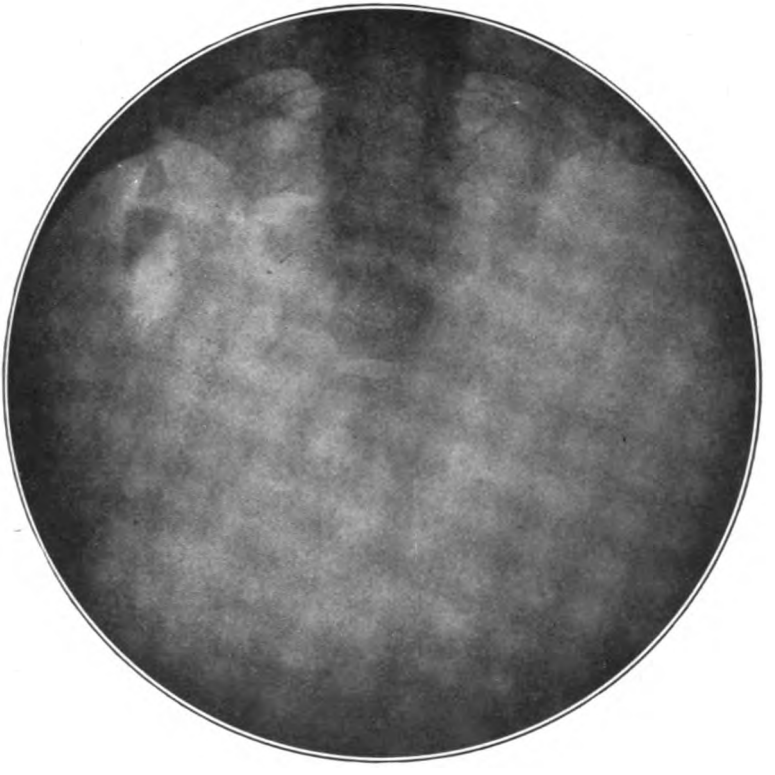

FIG. 13.—Case XIV.

Remarks.—The long freedom from the trouble after the passage of stones in 1898, the sudden occurrence of trouble anew with two calculi in the kidney and one in the ureter, are the noteworthy features of this case. The renal calculi were not operated upon as they were not causing symptoms, and the condition of the patient was bad.

CASE XVI.—Referred by Dr. Scaturo, of New York. Aged twenty, when seen November 10, 1912. Married in January, 1912, and had a child in October of the same year. From the time she was five months pregnant she had pain over the appendix region, and had

chills and fever which led to the diagnosis of typhoid fever. The urine contained much pus.

The patient is anemic and shows the result of her sickness. The catheterized bladder urine contains much pus. Cystoscopy of the bladder negative. Clear urine from the left kidney. The right ureteral catheter was obstructed at 5 inches; purulent urine from the right. Radiographs of the urinary tract showed a shadow at the point of obstruction on the right. The patient felt better after the examination, which was probably due to the fact that I loosened up an impacted stone.

On December 8, I removed the stone transperitoneally. The ureter above the stone was dilated to the size of the adult forefinger and was much thickened. The incision was made through the peritoneum, which was adherent to the underlying ureter, and the stone removed. An ounce of urine escaped and shot up into the air about an inch and a half, although the pelvis of the patient was elevated. The wound in the ureter was closed with fine catgut and the peritoneum sutured over it. The stone was T-shaped, and 1/4 inch long, with the transverse part of the T something over 1/8 inch broad. Patient made an uninterrupted recovery and, at the present time, September, 1913, is well and free from symptoms.

CASE XVII.—Seen first May 13, 1910. Forty-nine years old. Menopause at forty-two. Her first labor was in 1888, and was instrumental. For six months she was very sick with puerperal fever and phlebitis of both legs, and not well for fifteen months. From 1888 to 1891 she suffered with frequent attacks of pain in the right renal region, and high temperature. The last one terminated in the passage into the bladder of a large amount of pus.

There was no trouble until 1907, when she began to have similar attacks in the left side, lasting four to five days. In the past year she has had several. Has had moderate pyuria since 1900.

Catheters easily passed into both ureters. That from the left kidney drains purulent urine; that from the right clear.

Radiographs showed two shadows in the pelvis that were diagnosed as ureteral calculi after a confirmatory plate with an *x*-ray catheter (Fig. 12).

On January 16, 1911, in Quebec, by the combined intra- and extraperitoneal operation, with an incision along the outer border of the rectus, I removed two small stones from the ureter, which were situated 2 inches from the vesical orifice. Cigarette drain for forty-eight hours, after which time there was no leakage. The ureter was not sutured.

This patient was seen April 12, 1912, and reported that she was well and had had no further trouble.

The stones were only 1/8 inch in diameter, a size that would ordinarily easily pass through the ureter. These were very adherent to the ureter, yet the ureteral catheter was passed with no sensation of obstruction.

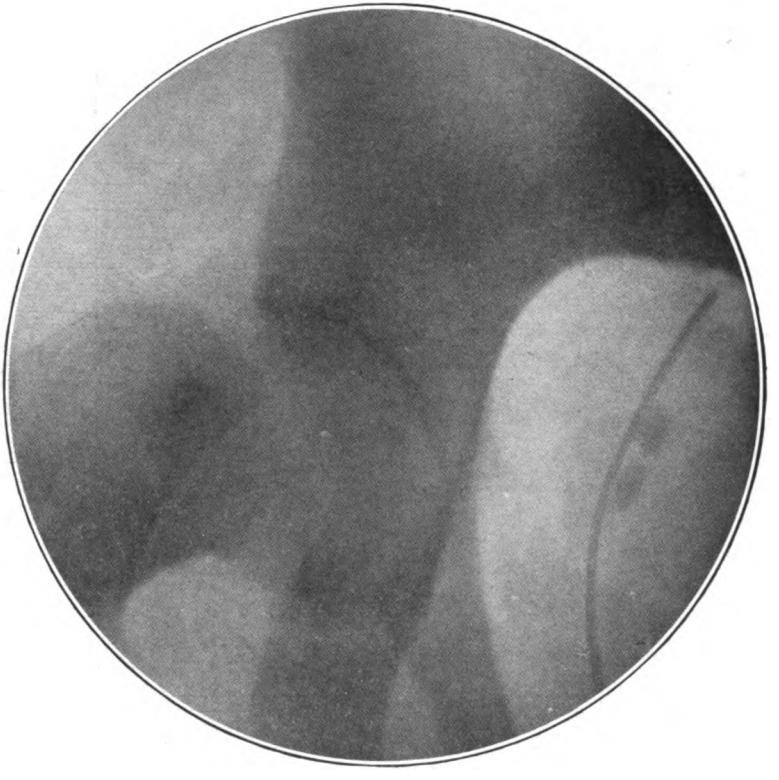

FIG. 14.—Case XVII. Two stones in left ureter. The tip of the bougie is 4 inches from the vesical orifice of the ureter.

CASE XVIII.—Seen first in November, 1909. Fifty-six years old, nine children, last born in 1899. Was in good health until 1904, when she began to have attacks that presented the following symptoms: Lassitude for a few hours, lameness in the right leg, soon followed by slowly developing pain in the right lumbar region, which soon radiated to the front and down the ureter to the bladder. When the pain was at its worst there was vomiting. An attack lasted, as a rule, about twelve hours. During an attack there was frequent desire to urinate; the urine then passed was clear, while that follow-

ing was turbid and had a heavy sediment. She has had these every two or three months, the last one being in August, 1909.

Cystoscopy negative. Ureteral catheter easily passed on the left; the urine from this kidney was clear. On the right the catheter was obstructed at 3 1/2 inches, and through it no urine was obtained. Indigo-carmine injected intramuscularly was eliminated in nine minutes from the left kidney, while none was observed from the right.

FIG. 15.—Case XVIII. Two large and one small stones in right ureter, the lowest being three and a half inches from the vesical orifice of the ureter, as measured by a ureteral catheter.

Radiographs showed two large stones in the pelvic portion of the right ureter (Fig. 13).

On January 13, 1913, through an incision along the outer border of the right rectus, I removed these two stones extraperitoneally. Each stone is 3/4 inch long by 1/4 broad. The wound in the ureter was closed with fine catgut, and the abdominal wound drained for twenty-four hours. There was no leakage, and healing was prompt.

For six years this patient suffered from attacks due to these stones, and in this time the renal function was destroyed. Early diagnosis and treatment would have saved her a good kidney.

CASE XIX.—Referred by Dr. Edward Quintard, of New York City. Seen first in June, 1910, when she was fifty-seven years old. Has had three children, the oldest born in 1877, and the youngest in 1897. Labors normal. Menopause uneventful at the age of forty-eight.

Previous history negative. In June, 1909, the patient for the first time had colicky pain in the left renal region, which did not radiate, and lasted twelve hours. There was nausea and vomiting during the attack. At this time there was no frequency of urination, but a month later she began to be so troubled, and this has persisted until the present. Since the first attack there have been three others, but none so severe as the first. The urine is normal except for the presence of a few pus and red blood cells.

By vaginal examination, just to the left and behind the cervix, is felt a small hard, oblong mass. The bladder appears normal. On the left side the ureteral catheter meets an obstruction at 3 to 4 inches which can be passed. A waxed catheter was then passed and all the wax scraped off. Radiographs show a shadow at the point the ureteral catheter was obstructed.

Attempts were made to have the stone pass by dilating the ureter to 20 French, but were not successful. There was marked inflammatory reaction in the ureter after this instrumentation, and this explains the failure. She refused operation, and was lost sight of.

In this case the pain was renal and the only thing to indicate a low position of the stone was the frequent urination. Although the stone was in the terminal portion of the ureter, the appearance of the ureteric orifice was perfectly normal.

CASE XX.—Referred by Dr. E. W. Peterson. Seen first July 10, 1912. Forty-nine years old. In 1901 patient had a three-day attack of pain in the right lumbar region, followed by the passage of a stone and hematuria. She was free from pain and any bladder disturbance until April, 1912, when she had pain for an hour in the right lumbar region. Since then she has had almost constant macroscopical hematuria, and urgent and frequent urination.

The catheterized bladder urine is turbid and reddish from the admixture of blood and pus. Cystoscopy shows what appeared to be a broad base papilloma over the region of the right ureter, with surrounding edema. This could also be felt through the vagina. Thinking it a papilloma, I fulgurated it on July 14, and again on July 18. At an examination on the 21st, I was surprised to see a dark stone projecting through the tumor-like mass. An attempt was made to liberate this through a Kelly tube with the aid of a small curet. This was unsuccessful as the patient was very fat, and

would not retain a proper posture and repose. On July 25, another examination showed the stone almost born. It appeared to be of the size of a hazelnut. I planned to have her come to the hospital with the idea of (under ether) introducing a large Kelly cystoscope and seizing the stone with a wire snare and thus removing it, and if it were too large, to crush it with a lithotrite and wash out the fragments.

We had had radiographs made, which were unsatisfactory, so this accounted for the error in diagnosis.

After this I did not see the patient until January, 1913, when upon examination I found two stones the size of hazelnuts in the bladder. The ureteral opening on the right was the size of a lead pencil and was not inflamed or edematous. She had had much pain for three months in the right side, so I suspect the presence of other calculi in the right kidney or ureter.

This was a very instructive case and shows that all cases of supposed papilloma, where the growth is situated over a ureteric orifice, and there is edema, should be radiographed for stone. Fulguration is a slow, but bloodless, and only slightly painful method of liberating these impacted calculi in the lower end of the ureter.

CASE XXI.—Seen first in January, 1913. The history of this case is rather indefinite as I have been unable to ascertain all the facts. Three months before I saw her, she had had her right kidney explored, and it was said that then she had an infected hydronephrosis due to ureteral obstruction. From time to time, previous to operation, she had been having marked pain in that kidney and running a temperature. Until the drainage wound healed she did well, but upon its closure she began anew to have her old symptoms. A month and a half before I saw her she was operated upon for the same condition by another surgeon, who obtained the same results. The three weeks before my visit she had been running a high temperature and having a great deal of pain in the right side.

The left ureter was easily catheterized. On the right side the catheter met an obstruction at 1 inch. This obstruction was movable, and at the end of my examination I was able to get the catheter in without resistance 2 1/2 inches, but no further. By the vagina I felt a hard mass in the ureter region, about the size of a pea, that I felt sure was a stone. I suggested radiographs, and the shadow of a stone was found.

The surgeon who did the second operation removed this stone extraperitoneally, and the patient made a good recovery and has been relieved.

With our present-day methods of diagnosis, I think it inexcusable

for a surgeon to explore a kidney without making use of them. This case is one in point.

There were twelve cases of renal, six of ureteral, and three of combined ureteral and renal cases.

Hematuria.—In one (Case I) a brisk hematuria of eight days' duration was the only symptom. In Case VI the blood came from a kidney that was causing no other symptoms, the pain on the other side being due to a hydronephrosis, and in Case XIV hematuria was the principal symptom, though she had had pain upon passing calculi. Case IX had hematuria and pyuria on both sides, yet on one there had been no pain for three years, even though the pelvis was filled with a large stone.

Pyuria.—In Case V it was the only symptom and had been present for years, while in Case VIII pyuria had existed for some time with only slight renal pain. In Case VII the pyuria was evidently of long duration, and yet with the large calculi she had had only one brief attack of pain. In five others (Cases II, III, X, XI, XV) there was pyuria, but this was accompanied by other symptoms.

Pain.—In five (Cases II, IX, X, XI, XII) the pain was severe, while in four (Cases III, IV, VII, VIII) there was only slight discomfort. In three (Cases I, V, VI) it was of no consequence. In Case IX there were calculi in both kidneys, yet for three years there had been no pain in one. In the mixed cases of renal and ureteral calculi (Cases XIII, XIV, XV) I think the pain due entirely to the ureteral stones.

Damage to the Kidney.—In three (Cases VI, VII, IX) there was marked damage to the renal function from pyelonephritis, and in three (Cases V, X, XI) the function was practically destroyed.

Multiplicity of Stones.—In six (Cases V, VI, VII, XIII, XIV, XV) more than one stone was found. In three (Cases VIII, IX, XII) there were stones in both kidneys. In Case XIV there were stones in the left and its ureter and in the right ureter. In three (Cases XIII, XIV, XV) there were stones in the kidney and its ureter.

History of the passage of one or more calculi was obtained in five (Cases IV, X, XIII, XIV, XV).

Symptoms arising during pregnancy were observed in three (Cases XI, XIV, XVI). One of these (No. XVI) falls under ureteral calculi, but is here included.

All the patients, except one (Case VIII) were radiographed, and in this one the diagnosis was made with the waxed catheter. Only once did the radiographs fail to show the presence of stone (Case XII).

In the renal cases cystoscopy alone showed nothing that was diagnostic of stone; no changes were observed in the appearance of the ureteric orifices.

Pyelotomy was done in four (Cases I, III, VI, IX). In two (Cases I, III) the pelvis was sutured, while in the other two (Cases VI, IX) it was not.

In one pyelotomy and nephrotomy, without suture of the renal pelvis, was done.

Case XI should have a nephrectomy as the calculous kidney is functionless. Case I had best not be operated but be kept under observation. In Case XIII the stones are small and will probably be passed spontaneously. In Case XII the radiographs failed to show stones, and it would be difficult to find such small stones as she passes; she had better not be operated. Three (Cases IV, VIII, XIV) refused operation.

Deaths.—Case VI died from renal insufficiency, Case XV from postoperative pneumonia, and Case X from hemorrhage from a vein of the kidney pedicle, which was torn at operation and so retracted that the patient was moribund before the bleeding was controlled.

Case VII from whom several stones from an infected kidney were removed, will probably have to have a nephrectomy. Case IX is to return to have the stone removed from the other kidney.

Combined Renal and Ureteral.—Case XIV showed two calculi in the left kidney and three in its ureter, with another in the ureter of the right side. In this patient the principal complaint was hematuria that was, in all probability, from the kidney with the stones. In Case XIII there was to be seen a number of small calculi in the kidney and its ureter of the left side, but these are small and will probably be passed. During the passage of some of these marked edema of the ureter was seen cystoscopically. Case XV had marked chills and temperature due to an obstructing ureteral calculus; attempts to make this pass by the insertion of a ureteral catheter and the injection of glycerin and oil were unsuccessful.

Ureteral Cases.—In all six (Cases XVI, XVII, XVIII, XIX, XX, XXI) the pain was a prominent feature and in all it was renal. In three the pain came on periodically (Cases XVII, XVIII, XXI), while in three (Cases XVI, XIX, XX) it was constant, and in addition to being felt in the renal region, there was pain at the seat of the stone. In the attacks in all the cases there were chills and temperature.

Case XX was the only one that showed any evidence in the ureter of the presence of stone. In Case XIII (a combined ureteral

and renal case) there was edema of the ureteric orifice. Case XIX had the stone in the intravesical portion of the ureter, yet there was no change in the ureteric orifice.

In Cases XIX, XX, XXI, the stone could be felt through the vagina.

In four (Cases XIII, XVI, XVIII, XXI) the catheter could not be passed beyond the stones, in two (Cases XV, XIX) with difficulty, in one (Case XVII) there was no sensation of obstruction. In Case XX there was so much edema that the ureter could not be found.

There was some pus in all.

In two (Cases XVIII, XX) there was complete destruction of the kidney function; in Case XVI impairment and a hydroureter and a hydronephrosis.

In two (Cases XVIII, XXI) the stones were removed extraperitoneally; in Case XVII by the combined intra- and extraperitoneal method, and in Case XVI by the transperitoneal route. Case XV, a combined case of renal and ureteral calculi, had the ureteral calculus removed transperitoneally. In three (Cases XV, XVI, XVIII) the ureter was sutured and there was no leakage. In two (Cases XVII, XXI) it was drained. Recoveries in all except Case XV, who died of pneumonia.

In three attempts were made to dislodge the stones with the ureteral catheter, the injection of oil and glycerin, and the ingestion of large amounts of water, but without success.

CONCLUSIONS.

Renal and ureteral calculi are frequent Two or more stones in a kidney, or kidney and ureter of the same side, and stones in both kidneys and ureters are not infrequent. Ureteral calculi are, I believe, almost always renal in origin.

On symptoms alone, the diagnosis is often only problematical, for typical stone symptoms are encountered in other conditions, and stone cases are numerous with few, if any, symptoms. The attacks encountered in Dietl's crises of floating kidney, in stricture of the ureter, and in tuberculous kidneys and ureters, are symptomatically like those of calculous colic.

The diagnosis is best made radiographically, and in suspected cases the *x*-ray examination should follow the taking of the history and the urinalysis, and precede all other methods of diagnosis. In only a small percentage is there failure to find stones that are present. In doubtful shadows, an *x*-ray catheter should be inserted into the ureter, or the ureter injected with argyrol, and other radiographs made, best stereoscopically. An advantage of the argyrol method

is that should a stone have been present for any length of time there will almost surely be a dilatation of the ureter above it, and this will be shown. To corroborate the radiographic diagnosis, which is seldom necessary, and to be used when a good *x*-ray apparatus is not to be had, is the waxed catheter.

Where shadows of stones are found and there is pain on the other side, we should be wary in calling it reflex. A most careful search should be made for some condition that is causing the pain. A good illustration of this is my case where on the side with two large stones there was no pain, and on the other a ten-ounce hydronephrosis that was causing all the symptoms.

The amount of damage done to the kidney from the presence of stones, depends upon the size, location and whether or not there is infection. The stones that cause the most destruction are those that cause blockage of the ureter, either in the pelvis or in the ureter. Aseptic stones in the calices, unless of large size, do little damage, though they are prone to cause hematuria.

The extent of the damage to the kidney can be, and should be, ascertained before operation, as its condition will largely determine the procedure to be carried out. For the combined functional capacity of the two kidneys, I use the phenolsulphonephthalein test. If the two show a good output, I infer that at least one kidney is doing good work. The relative capacity is then found by observing through a cystoscope the elimination from the ureters of indigo-carmine that has been injected intravenously (10 c.c. of a three-tenths of a 1 per cent. solution). This eliminates the error of ureteral leakage, and does not necessitate prolonged ureteral catheterization.

In simple renal calculi, I think pyelotomy, or a combination of pyelotomy and nephrotomy, is the most satisfactory operation. Nephrotomy alone is best reserved for the cases where one of the other two is not suitable. In pyelotomy I do not think it either necessary or desirable to suture the renal pelvis, unless the case is an aseptic one, as the wounds close promptly and there is no danger of a fistula unless there is ureteral blockage lower down. If there are multiple stones and marked infection, and the other kidney is free of stones and in good condition, then I think nephrectomy the operation of choice.

When renal and ureteral calculi are both present, and the condition of the patient does not warrant operations for both, I believe that the ureteral stones should be the first to be removed, as they are the ones that are likely causing the obstruction and symptoms.

Many ureteral calculi are passed naturally, and when a patient

is seen with symptoms of recent date and they are not urgent, it is best to wait a reasonable time for the stones to be expelled. Should the stone become arrested, or it be a case in which the stone has made no progress in a long time, attempts to dislodge it with a ureteral catheter and injections of oil or glycerin, should be made. If these are unsuccessful, the operation can be undertaken. For those that cannot be attacked from the vagina or bladder, the best procedure in stones that will be difficult to locate is the combined intra- and extraperitoneal operation. If they can be easily found on account of their size, I would prefer the extraperitoneal route. It is not necessary to close the ureter, as it heals rapidly. A cigarette drain near the ureter had best be used for seventy-two hours, or while there is still drainage. If the stones are to be felt through the vagina, they can be removed through it; if impacted in the vesical orifice, by slitting the ureter through an operating cystoscope, or after suprapubic cystotomy, or by cautery fulguration as in one of my cases.

DISCUSSION ON THE PAPERS OF DRS. SHERRILL, FOSTER, SANES AND FURNISS.

DR. G. VAN AMBER BROWN, Detroit, Michigan.—These four very interesting papers have covered the field pretty thoroughly, yet there are some points I would like to touch upon and emphasize.

First, concerning essential renal hematuria, that is usually unilateral and associated, as a rule, with pain. It is not due to any well understood cause. The condition occurs in both men and women. It occurs usually between the ages of twenty and forty, and very frequently, not always, in those under thirty years of age. It occurs in apparently normal kidneys. Hale White has recently reported a series of cases from which he cites five of renal hematuria. In these he could find no pathological lesion of the kidney whatever. These cases do not seem to be hemophilics because they do not bleed elsewhere. Furthermore, it does not follow through families as hemophilia does. They are not cases usually that give a history of having had injuries. They cannot be classed as suprious menstruation, because they occur in men as well as women. Speaking of them as being angioneurotic and neuropathic does not enlighten us a particle.

I think it was Senator who examined a number of these kidneys after operating, he found there was no indication of disease of the kidney either microscopical or macroscopical. He does find that by simply cutting the kidney or doing a nephrotomy these cases are cured.

Recently I have had three cases of hematuria that, by every manner and means, following them out with x-ray examinations,

catheterizing the ureters, making a microscopic examination of the urine, chemical analysis, etc., I could not get a single sign of disease except one symptom, that of bleeding. It may be unilateral, but sometimes it will be on the right side and at another time at the left side. I had one case, a man, forty years of age, in whom I thought the trouble was in the left kidney. Two or three days later the right one was bad and the left one acting normally, I gave him an injection of a few minims of normal horse-serum to test for sensitization and followed it an hour later with 10 c.c. and the bleeding stopped, but recurred. Afterward I found he was a gormandizer, and when I limited the diet he did not bleed.

The two other cases were men, one twenty years of age, the other forty-five, the latter had been bleeding for five years. I saw him last December, and although he does heavy work, he like the other, has not had any recurrence of the trouble whatever. Their bleeding stopped permanently after the use of 10 c.c. normal horse-serum given hypodermically. I believe that in some of these cases the hemorrhage is due to a toxemia. I forget the name, but some of you were at Minneapolis attending the meeting of the American Medical Association and will probably recall at the scientific exhibit one exhibit made by some Chicago man. He has been for ten or eleven years injecting bacteria into the blood stream and growing vegetation upon the heart. In many of these cases he gets hemorrhage of the kidney, and says the intima is affected in some way so as to produce kidney hemorrhage. A man with a curved spine, a distorted or supernumerary rib, in assuming certain positions may bring pressure upon the renal vein and produce bleeding.

DR. HENRY DAWSON FURNISS, New York.—I am interested in these hematuria cases, but I will confine my remarks to those not due to tuberculosis, tumor or stone, but to that class usually called essential hematuria.

I have had ten of these, seven unilateral, three bilateral. There of these were decapsulated with a cessation of bleeding in all.

Two unilateral cases were decapsulated with no benefit: in them subsequent nephrectomies were performed. In one of these nothing was found by careful microscopical examination. In the other there was evidence in the pelvis that the hemorrhage was of submucous origin.

In one unilateral case the bleeding ceased after ureteral catheterization.

I have only recently seen a case of profuse unilateral hematuria, but as yet we have not studied it sufficiently to determine its cause.

One bilateral case died without operation, with all the evidences of chronic nephritis. In another bilateral case the bleeding from both kidneys ceased after the decapsulation.

The third bilateral case was seen during pregnancy, during which time the hemorrhage continued; since then there has only been a slight amount of blood in the urine.

It is admitted by many that chronic nephritis is seldom if ever confined to one kidney, but that the hemorrhage in these cases of chronic nephritis is usually from one kidney. In making the

diagnosis in these cases, we have examined the urine from the non-bleeding kidney, and in nearly all the cases it has shown evidences of nephritis.

Dr. Foster has given us a very valuable paper on renal infections. I have been very much interested in postoperative renal infections, and at the last meeting of the American Medical Association presented a history of ten such cases. The infection in these cases occurred from five to twenty days after operation. They were more frequent in those cases where the operation was upon the intestinal canal or the perineum. I believe the condition is due to the breaking up of infected thrombi and metastatic lodgment of emboli in the kidney.

In reference to the paper by Dr. Sanes, I disagree with him in regard to the steady flow of urine from the ureteral catheter as evidenced that the catheter is in the renal pelvis. I have had a number of cases where there has been a continuous flow from the ureteral catheter when it was only 4 inches in the ureter. It is very difficult to estimate the size of the renal pelvis in the manner that he has described in the pyelograph. In this we have a method that shows the amount of dilatation and the nature of its cause.

Very frequently we are unable to diagnose ureteral obstruction with the ureteral catheter, as there are a number of instances of stricture in which there is no resistance offered to the passage of the catheter. In these cases I consider pyelography the only sure method of diagnosis.

DR. DAVID HADDEN, Oakland, California.—I would like to endorse the position taken by Dr. Sherrill.

In reference to the paper by Dr. Sanes concerning the use of the renal catheter, I will say that I have done considerable work lately on the kidney, and I have found in those cases where there is a dilated kidney pelvis, from that side you get a continuous drop. I do not think we can consider it diagnostic of kidney trouble by passing a catheter up into the pelvis of the kidney.

DR. SHERRILL (closing the discussion on his paper).—I have been especially interested in the subject of what has been called essential hematuria or the symptomless hematuria, having exhausted all methods of determining the cause and then finding when you cut down, in some instances, dilated veins, and in other instances you find nothing. It seems to me, many of these cases are due to minute crystals passing through the kidney; others are due to congestion produced by disease of the lungs or cardiac lesions, as mentioned by Dr. Furniss in one of his cases, causing damming back of the blood in the renal vein and twisted pedicle of the kidney. Many of these conditions clear up by the manipulation of the kidney itself, especially those due to torsion of the kidney from displacement. I think that a study of this class of cases will clear up to some degree our knowledge of the pathology. Some of them are undoubtedly due to inflammation of the kidney structure and we have operated upon them, and the amount of tissue taken away for examination has been too small to give a good idea of the exact pathology.

DR. SANES (closing the discussion on his paper).—One of the reasons for the presentation of this paper is the fact that analyses of bladder-urine and *x*-ray examinations are not always sufficient to clear up the pathology of the kidney and ureter, and that by the use of the catheter a diagnosis can be made that cannot be reached otherwise. Exception was taken to the mode of differentiation between the character of the flow of urine from a catheter inserted in the pelvis of the kidney and the flow from catheter inserted in the ureter. It is true that occasionally we find a continuous flow from a catheter inserted in the ureter, especially when the patient catheterized is nervous or has a hydro-ureter. But even in such cases if you leave the catheter in the ureter long enough the continuous flow becomes in time intermittent.

As to the renal capacity, it is not an easy matter to investigate it, consequently it is essential to use every possible method to determine it. With the catheter in the pelvis, if we press on the kidney and obtain a continuous flow or stream, we know we have residual urine and by injecting a fluid in the pelvis of the kidney we get a general idea of its capacity. There are cases of relaxed kidneys without any definite pathology (especially in nervous people) that will admit a considerable quantity of urine. Again healthy kidneys may give us only a few drops of urine on catheterization and cause severe colic on injection of a very small quantity of fluid. But such cases are rare. As a whole, the great value of the catheter cannot be disputed.

We spoke of the value of pyelograms and showed, among other abnormalities, strictures. Mention was made, during the discussion, of the fact that the catheter does not always show a stricture. This is true, but it is also true that by the aid of the catheter a stricture can frequently be discovered that cannot be discovered otherwise. Recognizing the value of the renal catheter we have been in the habit of practising the following routine investigations in cases of bad kidneys: We introduce a catheter for an inch in the ureter and obtain urine for analysis. Then we pass the catheter into the pelvis of the kidney, and if no ureteral obstruction is found, we obtain a pelvic specimen of urine. If it is important to decide the question of renal function, the phenolsulphonephthalein test or any other of the efficiency tests is employed. We inject into the patient phenolsulphonephthalein, and obtain through the catheter the necessary specimen for the function test. An *x*-ray picture is then taken of the ureter and kidney. After this we inject into the renal pelvis a 5 per cent. solution of collargol to its full capacity and take another radiogram. We then have two *x*-ray pictures—one of the catheter (we always use an *x*-ray catheter) showing the course of the ureter and any stone which might be in the course of the ureter or in the renal pelvis, and the other, the pyelogram and a ureterogram, showing the shape, size and location of the pelvis of the kidney and ureter. Such an examination is of great value because in some of these cases not only can the diagnosis be made by the findings but definite operative procedures may sometimes be outlined by them, as shown in the pictures which were projected on the screen.

LOCAL ANESTHESIA IN OPERATIONS FOR HERNIA.

BY

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THE use of remedies applied locally for the production of anesthesia or analgesia is as old as surgery itself. History tells us that the ancient Egyptians, Chinese and Roman physicians, as well as the medicine men of Africa, knew of the artificial production of sleep and used such remedies as alcohol, mandragora root, hemlock, henbane, poppy, opium and cannabis indica to reduce the pain incident to surgical operations. It is related that in the middle ages instruments were heated or greased to diminish pain. Gold and silver instruments were constructed for the same purpose. The ancient Egyptians, according to Braun, were supposed to have produced local anesthesia by the fat or the dried skin of crocodiles and by the use of the so-called stone of Memphis, the latter being rubbed into the skin with vinegar. Religious and mystic ceremonies accompanied the use of these remedies and it is highly probable that the anesthesia was more suggestive than real.

Compression of the main nerve trunks of the extremities was a method employed in the earliest times to diminish the pain of amputations. This method was used in the sixteenth century and was highly recommended by Ambrose Pare. Compression of nerves was practised in many ways, from the simple method of encircling the limb with a tight constrictor to the use of a special appliance or apparatus.

In 1784, J. Moore, in England, invented an apparatus for the direct compression of nerves and was able to make a painless amputation of the leg after compressing the sciatic nerve for one and one-half hours. Hunter and Bell recommended the method. Although this method fell into disuse, it was revived and freely discussed, upon the introduction of the elastic bandage by von Esmarch.

The application of cold for anesthetic purposes was introduced by Thomas Bartholinus in the sixteentth century. John Hunter found that the ears of a rabbit became insensible to pain when they were previously subjected to cold. Baron Larrey, Moncheau

Beaupre in the Napoleonic wars (at Eylau and in Russia), made the observation that amputation of limbs subjected to extreme cold was painless. The use of cold for anesthesia was not deliberately employed until Amot introduced it in 1848. (Richet in 1854, also Richardson in 1866). The use of cold is still of value, although greatly limited in its range of application. From time immemorial remedies which were known to produce sleep were also thought to have local anesthetic properties. This idea was prevalent even after the discovery of the modern anesthetics, such as ether and chloroform. Thus we read of the local application of cannabis indica, alcohol, aconite, hemlock, mandragora, opium, hyoscyamus, and many other remedies for the production of anesthesia. It is more than probable that anesthesia was seldom, if ever, produced by these remedies.

Many other interesting and peculiar remedies were employed in the past for the production of local anesthesia, such as the galvanic current; the use of escharotic pastes to surround the operative field and cataphoresis.

The invention of the hypodermic syringe by Alexander Wood in Edinburg in 1853, whereby remedies could be introduced below the surface of the skin, must be considered as one of the most important steps in the evolution of our modern method of local anesthesia. Morphine, opium and chloroform were injected directly into nerve trunks for their supposed local anesthetic action.

With the introduction of cocaine in 1884 the advance has been rapid and the method gradually made safe.

The history of modern local anesthesia is practically that of the evolution of cocaine and allied drugs. The earlier efforts at local anesthesia with cocaine were often attended by severe toxic symptoms and in some instances by death. A reduction in the amount of cocaine necessarily followed, until very small doses, even as low as one-tenth of 1 per cent., were employed. Much credit is due to Schleich of Berlin, who perfected the infiltration method of local anesthesia, using minute doses of cocaine in combination with morphine. With the introduction of synthetic preparations such as eucain, tropacocain, holocain, alypin, novocain and stovain, local anesthesia became less dangerous.

The discovery of adrenalin in 1901 (Takamine and Aldrich) was of the greatest importance for the advance of local anesthesia. Previous to the introduction of adrenalin, efforts to reduce the absorption of the anesthetic agent and at the same time intensify its action, were made by adding gelatine to the solutions, by the use

of constrictors above the field of operation or by the application of cold. It was soon found that the addition of adrenalin in anesthetic solutions by its vasoconstrictor action not only reduced the rate of absorption but also intensified the anesthesia.

Clinical experience, as well as much experimental evidence, has shown that of the newer preparations, novocain is less irritating to the tissues, and less toxic than any other drug. When used alone novocain is fleeting in its action, but when used with adrenalin its action is prolonged. It can be safely used in large quantities and therefore makes good anesthesia more certain.

The history of local anesthesia would not be complete without mentioning the important pioneer work of Crile and Cushing in cocainization of nerves, or "nerve blocking." The study of the difference in sensibility of the various parts of the body, as worked out by Lennander, has had a most important bearing upon the progress of local anesthesia methods. Lennander demonstrated that both in health and in disease, the abdominal and pelvic viscera are devoid of sensation, but that the parietal peritoneum is very sensitive to pain. A knowledge of Lennander's work is therefore of the utmost value to the operator who desires to secure the best results with local anesthesia.

With novocain and adrenalin in local anesthesia, the following operations are reported in the literature as having been successfully performed. Operations upon the skull and brain; resections of the superior and inferior maxilla; excision of the tongue; thyroidectomy, excision of the larynx; resection of the esophagus; radical operation for tuberculous glands of the neck; rib resections; thoracotomy; gastrostomy; cecostomy; exploratory laparotomy; appendectomy; all forms of hernia; suprapubic prostatectomy; perineorrhaphy; colporrhaphy; vesicovaginal fistulæ; curettage; dilatation of cervix; the reduction of fractures and dislocations; anesthetizing the brachial plexus for operations on the arm; amputations of the lower extremity and many others of equal importance and magnitude.

The two methods of producing local anesthesia which experience has shown to be the most successful are (1) the method of infiltration after Schleich, and (2) the conduction method, or "leitungs anesthesia," as perfected by Braun. In the former, the anesthetic agent is injected directly into the field of operation, while in the latter the anesthetic solution is placed around the operation site and aims to block or interrupt all innervation to the part. In other words, not only around but also underneath.

In general, it may be said that success with either technic depends

largely upon the amount of care exercised, the experience of the surgeon with the technic of the local anesthesia method, as well as his experience with the operation itself.

Operations to be successful under local anesthesia must be anatomically performed, with perfect hemostasis.

Failure to secure satisfactory anesthesia is not due so much to the shortcomings of the method as to the improper use of it.

The infiltration method of Schleich so successfully used in hernia operations of Bodine and others, is more complicated than the conduction method of Braun.

The conduction method is simple and gives an anesthesia over a large area. In Europe it has almost entirely supplanted the other forms of local anesthesia.

Local anesthesia in abdominal surgery finds its greatest application in hernia operations. By many surgeons it is now considered the anesthetic of choice for such operations. The use of local anesthesia for hernia operations is always indicated in the aged, or in the presence of severe organic diseases, such as cardiac lesions and diseases of the lungs, liver and kidneys. It is particularly indicated in strangulated hernia.

It is well known that only a small percentage of patients with hernia are operated, and that deaths from strangulation are not uncommon. In my experience the chief reason given by patients for not submitting to hernia operations has been the fear of a general anesthetic. Many patients have expressed themselves as feeling assured that the operation itself is curative and without danger, but do not care to risk anesthesia with ether or chloroform. Patients readily consent to hernia operations when informed that it can be done without pain and without a general anesthetic.

The disadvantage of local anesthesia is that of operating upon a conscious patient. This, however, is largely overcome by the use of preliminary hypodermic injections of morphine in combination with atropin or scopolamin.

Operations for inguinal hernia can be performed just as thoroughly under local anesthesia as with a general anesthesia. This is also true of umbilical hernia in patients who are not too obese.

The solutions of novocain and adrenalin employed range from 1/2 to 2 per cent. The 1/2 and the 1 per cent. solutions are most frequently used. The quantity of the solution to be employed varies with each operation. According to Braun, as much as 200 c.c. of a 1 per cent. solution has been used by Axhausen, although the average amount is only 50 to 60 c.c. The 1/2 per cent. solution

which appears to be the standard solution is used by Braun and many others in quantities as high as 200 or 250 c.c. without the slightest toxic effect. The quantity of adrenalin added to the solution ranges from three to ten drops per ounce.

The preparation of the solution is simple. The novocain, adrenalin and distilled water in the desired amounts are placed in a flask, boiled for three minutes, it is then ready for use.

The syringe used should be of the Record type. My own preference is for the Record syringe of 10 c.c. capacity with a right-angled needle, the needle being about 2 1/2 inches long. The part to be operated upon is surrounded by a novocain barrier which is either rhomboid or diamond in outline. The superficial structures are first "blocked" by placing the solution directly under the skin. The deeper structures of muscle and fasciæ are blocked by introducing the needle into them, but two insertions of the needle are necessary when the barrier is diamond in outline: with the rhomboid outline about six punctures must be made. The introduction of the needle is rendered painless by infiltrating the skin with the Schleich method. The individual nerves, when encountered in the field of operation, should be anesthetized separately. The solution must also be deposited around the nerve tracts which supply the parts to be operated.

It is absolutely essential that fifteen to twenty minutes elapse from the completion of the injections to the beginning of the operation. Attempts to operate before the expiration of the amount of time will be met with failure. After the proper wait, the operation is begun and proceeds with the same ease as with a general anesthetic. Supplementary injections into the deeper structures after the skin has been incised may be used. With this method of local anesthesia I have performed thirty-six operations upon twenty-eight patients, eight of these being operated for double hernia. The operations were as follows:

No.	Date	Age, yrs.	Hospital	Sex	Duration of hernia	Duration of operation.	Type
1	Dec. 4, 1909	20	Infirmary Hospital	M.	Several years	No record	Right inguinal
2	Jan. 8, 1910	50	Infirmary	M.	Several years	No record	Left inguinal
3	Apr. 12, 1910	78	St. Vincents Hospital	F.	26 yrs.	25 min.	Left femoral
4	Mar. 27, 1911	58	St. Vincents	M.	12 yrs.	47 min.	Right inguinal
5	Apr. 18, 1911	68	St. Vincents	M.	1 yr.	2 hrs.	Bilateral direct inguinal and incisional
6	May 24, 1912	54	St. Vincents	F.	1 1/2 yrs.	28 min.	Left femoral
7	May 30, 1912	38	St. Vincents	M.	28 yrs.	30 min.	Indirect left inguinal
8	May 30, 1912	29	St. Vincents	M.	4 yrs.	25 min.	Right indirect inguinal
9	June 1, 1912	44	Patient's home	M.	Few months	20 min.	Right direct inguinal
10	June 16, 1912	56	St. Vincents	M.	2 yrs.	34 min.	Right direct inguinal
11	Feb. 1, 1913	50	St. Vincents	M.	1 week	30 min.	Right indirect inguinal
12	Feb. 3, 1913	38	St. Vincents	M.	3 weeks	28 min.	Right indirect inguinal
13	Mar. 6, 1913	57	Infirmary	M.	Several years	40 min.	Bilateral indirect inguinal
14	Apr. 9, 1913	51	St. Vincents	M.	8 yrs.	35 min.	Indirect right inguinal and femoral
15	Apr. 15, 1913	56	St. Vincents	M.	2 yrs.	20 min.	Right direct inguinal
16	Apr. 15, 1913	30	St. Vincents	M.	2 yrs.	18 min.	Indirect left inguinal
17	May 22, 1913	35	St. Vincents	M.	10 yrs.	38 min.	Direct right inguinal
18	June 9, 1913	42	St. Vincents	M.	15 yrs.	35 min.	Direct right inguinal
19	June 14, 1913	40	St. Vincents	F.	19 yrs.	38 min.	Direct left inguinal
20	June 30, 1913	68	St. Vincents	M.	3 yrs.	32 min.	Direct right inguinal
21	July 9, 1913	23	Infirmary	M.	4 yrs.	32 min.	Direct right inguinal
22	July 14, 1913	69	Infirmary	M.	24 yrs.	40 min.	Direct bilateral inguinal
23	Aug. 9, 1913	47	Infirmary	M.	10 yrs.	30 min.	Umbilical
24	Aug. 18, 1913	21	St. Vincents	M.	10 days	24 min.	Right indirect inguinal

Size	Method of operation	Pathology	Wound healing	Amt. Novocaine and adrenalin used	Remarks
Small	Bassini	Uncomplicated reducible hernia	Primary	60 c.c.	Good anesthesia
Large	Bassini	Simple uncomplicated hernia	Primary	60 c.c.	Good anesthesia
Medium	Bassini	Strangulated small loop dark-colored gut in sac	Primary	20 c.c.	Good anesthesia
Large	Bassini	Uncomplicated reducible hernia	Primary	60 c.c.	Supplemented by general anesthesia
Large	Bassini	Incisional hernia from suprapubic prostatectomy obese pat. atrophy of muscles	Primary	100 c.c.	Supplemented by general anesthesia
Medium size	Bassini-Kocher	Strangulated	Primary	60 c.c.	Good anesthesia
Medium	Bassini	Uncomplicated reducible hernia	Primary	60 c.c.	Good anesthesia
Medium	Bassini	Simple reducible hernia	Primary	60 c.c.	Good anesthesia
Small	Bassini Ferguson	Simple reducible hernia	Primary	120 c.c.	Good anesthesia
Large	Bassini Ferguson	Reducible hernia uncomplicated	Primary	60 c.c.	Good anesthesia
Small	Ferguson	Reducible hernia uncomplicated	Primary	60 c.c.	Good anesthesia
Small	Ferguson	Reducible hernia uncomplicated	Primary	60 c.c.	Good anesthesia
Medium	Bassini left Ferguson right	Sigmoid adherent to sac on left	Primary	120 c.c.	Good anesthesia
Medium	Ferguson	Simple hernia	Primary	105 c.c.	Good anesthesia
Large	Ferguson	Hernial sac very adherent. diff. dis.	Primary	120 c.c.	Good anesthesia
Small	Ferguson	Simple uncomplicated hernia	Primary	75 c.c.	Good anesthesia
Medium	Ferguson	Omental adhesion to sac	Primary	90 c.c.	Good anesthesia
Medium	Ferguson	Recurrant. 5 previous op. old Bassini	Primary	120 c.c.	Good anesthesia
Large	Ferguson	Simple hernia	Primary	120 c.c.	Good anesthesia
Large	Ferguson	Strangulated large amt. of small bowel	Primary	120 c.c.	Good anesthesia
Medium	Ferguson	Removed hernia from app. reducible hernia	Primary	120 c.c.	Good anesthesia
Medium	Ferguson	Reducible uncomplicated hernia	Primary	110 c.c.	Good anesthesia
Medium	Mayo	Omentum adherent to sac	Primary	105 c.c.	Good anesthesia
Medium	Ferguson	Reducible hernia	Primary	180 c.c.	Good anesthesia

No.	Date	Age, yrs.	Hospital	Sex	Duration of hernia	Duration of operation	Type
25	Aug. 20, 1913	30	St. Vincents	M.	2 yrs.	38 min.	Bilateral direct inguinal
26	Aug. 27, 1913	56	St. Vincents	M.	Left side 15 yrs. Right side 3 yrs.	45 min.	Bilateral indirect inguinal
27	Sept. 5, 1913	69	St. Vincents	M.	13 yrs.	40 min.	Left direct inguinal
28	Sept. 13, 1913	46	St. Vincents	M.	12 yrs.	35 min.	Right direct inguinal

28 operations for radical cure of inguinal hernia.
3 operations for strangulated inguinal hernia with radical cure.
1 operation for radical cure of femoral hernia.
2 operations for strangulated femoral hernia.
1 operation for incarcerated umbilical hernia.
1 operation for incisional hernia.
36 Total number of operations on twenty-eight patients.
Mortality 0 per cent.

In only two of the earlier operations was it necessary to finish the operation under a general anesthetic. This was due to inexperience

Size	Method of operation	Pathology	Wound healing	Amt. Novocaine and adrenalin used.	Remarks
Small	Ferguson	Strangulated hydrocele of cord	Primary	120 c.c.	Good anesthesia
Right large Left medium	Ferguson	Hydrocele right side	Primary	180 c.c.	Good anesthesia
Large	Ferguson	Strangulated sigmoid omentum and dark-colored gut in sac	Primary	165 c.c.	Good anesthesia
Large	Ferguson	Several loops small bowel	Primary	150 c.c.	Good anesthesia

with the method. The operations were uniformly painless, without nausea or vomiting and without the slightest toxic effect from the anesthetic solution. The sensation of the operation is described by the patients as that of a pulling or tugging on the parts. In a few instances some pain was complained of when working about the hernial sac or peritoneum. This can be overcome by a separate injection of the neck of the sac early in the operation. As the adrenalin acts as a hemostatic, there is some danger of a postoperative hematoma. It is, therefore, necessary to ligate all blood-vessels as soon as they are divided.

DIAGNOSTIC HYSTEROTOMY.

BY

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MEDICINE may be divided into two parts, therapy and diagnostics. All the other branches correlate to one or the other. So practical, fascinating and self-satisfying is therapy that the profession as a mass faces that way. It is only when we use our deeper minds, not alone through force of habit but stimulated by necessity, that we endeavor to make correct diagnoses, and I am speaking of diagnoses in the broadest sense. We are all born therapeutists. Few of us are born to make correct diagnoses. The tendency to be philosophical, to depend upon intuition and to skip essential points leads to opinions imperfectly based but personally gratifying. Any procedure, however novel or disturbing to the mind which enables greater accuracy, should be studied and perhaps accepted.

A great change has come over medicine. The interest the public, particularly the press, has shown makes an increased demand upon the practitioner for cleverness in diagnosis and enlargement for prognosis. The early diagnosis of incipient conditions, especially of the cancerous state, in which we ask the public to join, reacts as positively upon ourselves that the ability be ours.

Inspection of the interior of the uterus and judgment of its disease states have been accepted for time past as accomplished. The clinical symptoms of endometrial changes overlap and we often find a similar syndrome under diverse pathologies. Since Sims in 1865 introduced the sharp curet to the profession the interior of the uterus has been explored by means of it. Its contour, size, consistency of the lining, and the condition of the uterus itself can be and has been largely determined by the sense of touch as felt through this instrument. So much can be discovered by the intelligent, trained operator by means of it that a sense of satisfaction even now pervades the profession as to its findings. Particles of endometrium and granulations that have been removed by the curet may be sent to the laboratory and there sectioned. By the method just stated a diagnosis of the condition of the interior of the uterus may be made with great accuracy, and in such institutions as Johns Hopkins Hospital, the Mayo clinic and others of equal completeness, this

will hold good, but surgery cannot all be done in these high-grade institutions. There are many excellent surgeons who have not at their command efficient laboratories and other aids which these places give. We have many small hospitals with little capital which provide no place to which the products of curettage may be sent for prompt determination. A freezing microtome is out of the question with them. Sanatoria are springing up numerously. Most excellent work is done in many of them. Then, again, the surgeon is often called to distances to operate in homes. In all these instances prompt, accurate working diagnoses must be made on the spot, for reasons which are best appreciated by the patient as well as by the attending physician. Repeated anesthesia, particularly outside the hospital, greatly tends to disturb professional relations.

Then, the curet is a *dangerous* instrument. Punctures of the fundus are common and gouging out of considerable portions with damage to viscera is not unknown. Degeneration of the uterus itself, softening of its tissue and loss of a sense of touch in the neighborhood of the fundus deceiving the operator lead to this untoward event. Careful men have entered the abdominal cavity.

There is another danger which exists in conditions of malignancy. A firm curettage incident to the removal of granulations may not only open the lymphatics and vascular channels, but may also lead to auto infection of parts of the uterus not primarily invaded. If it be wrong to incise a malignancy of some other part of the body, why should not the same principle hold as to the interior of the uterus? The curet must be entrusted to the occasional operator and to the man with poor personal equation; therefore, our preachment should be such that they can be instructed and controlled, because we cannot prevent the use of this instrument by them.

The curet is *incomplete.* Any one who has carefully curetted a uterus which was about to be removed, and after removal split it, will see that he had left behind in a condition of morcellement and subject to infection much of the endometrium. Particularly incomplete is it in the fornices where the tubes enter the uterus. Many curetments fail to explore this region and lesions existing there may escape discovery.

The curet is *incompetent.* We leave not only considerable granulation tissue, but pedunculated polypi, and even decidual remains not infrequently defy this procedure. A noted New York gynecologist recently remarked to his class after an operation, "I have done a complete curettage." That night the patient aborted

twins. He had not diagnosticated pregnancy. This summer at the Wertheim clinic, Dr. Wertheim's assistant did a vaginal hysterectomy on a woman with the following history: She had been delivered of a child at that institution. Two months after confinement she had considerable hemorrhage, was curetted, and the products of curettage sent to the laboratory and peculiar (?) bodies found. At the end of another few weeks she bled again and was again curetted. A week later she had a hemophthisis and in the blood from the lung the same peculiar (?) bodies were found. No diagnosis was made from them. As soon as she recovered completely, a hysterectomy was done. After removal, the uterus, which was not oversize nor changed in appearance, was split. On the posterior wall in the neighborhood of the right fornix was a slightly elevated crater about 1 1/2 centimeters in diameter, with rather a pulpy content—evidently a chorioepithelioma. Montgomery tells of one of his cases where after curettage had failed he did a diagnostic hysterotomy and found the uterus filled with grape-like masses. Dr. S. M. D. Clark had referred to him for radical operation a case diagnosed carcinoma from curetted scrapings. Laparotomy disclosed ectopic pregnancy and hysterotomy a normal endometrium.

The true history of the curet and its use we do not find in our text-books and rarely in our journals, and the warning of McMurtry should never be forgotten.

With the constant demand for prompt and early diagnosis, with the necessity of finding and radically operating for precancerous conditions, the day seems past for long-drawn-out efforts at diagnosis after the fashion of the gastrologist. There should be, perhaps, a little more surgery and a little less diagnosis. This, I know, is heresy, but it may be good judgment in the minds of some, at least.

Exploratory hysterotomy, that is, hysterotomy for complete diagnosis, should seldom be attempted *per se*. All the ordinary methods of exploration should be resorted to before this is used, but there are times when during operation for other conditions (whether above or below the bone), the uterus attracts attention, and not from its symptomatology but from its appearance, it seems wise to inspect it thoroughly, then hysterotomy without previous exploration is correct. I have met cases where the uterus alone attracted attention—persistent hemorrhage, occasional leaks, indicative of some chronic pathology—where curettage had failed to establish a diagnosis, or where I had lost confidence in it and felt the necessity of exploration in order that sight and touch might make things more conclusive. In these conditions a vaginal section, the fundus brought

down anteriorly, with hysterotomy is without danger and gives one confidence of a positive diagnosis.

The writer has found in some twenty-seven operations of this kind (six of which were by vagina and twenty-one by abdomen), thirteen different pathologies. He was led on the date of June 25, 1907, from the misadventure of removing a three-months' pregnancy under the diagnosis of soft myoma, to split suspicious uteri rather than unnecessarily unsex a woman.

The diagnosis of pregnancy is often impossible. There is no surgeon living who can surely diagnosticate this condition even with the uterus in his hands. Variations in the size, shape, color, mottling, intermittent contractions over the uterus, proceeding from the neighborhood of the tube, feeling, position of tubes, direction of entrance, size and consistency of them, and presence or absence of corpora lutea are as variable and inconstant as nature's symptomatology, which may be absent or incomplete. Each surgeon has met this dilemma. Carstens protests against exploratory hysterotomy saying, "there is too much operation and too little diagnosis," but we have cancer to fear and I have met beginning carcinoma of the fundus which very closely simulated pregnancy.

There is one important point in the technic of hysterotomy which should never be forgotton or considered lightly, and this is, closure of the uterine wound in the woman who may become pregnant. It should be carefully sutured so that there will be a minimum amount of scar tissue, or, rather, no scar tissue, and complete union in its entire length. The obstetrician in hysterotomy for pregnancy (Cesarean section) finds that with slow and careful closure of the uterine wound subsequent pregnancies occur without risk. If it is hurriedly or carelessly done and there be a gap and scar formation, the scar may bulge, particularly at the time of labor, and rupture ensue.

The history of hysterotomy appended is very meager, but interesting and instructive. Naturally, it was first used therapeutically, following the trend of general medical history. Only gradually did it become employed for the purpose of completing a diagnosis.

Memoranda on Hysterotomy in the Older Gynecological Literature, from Secheyron's Monograph.

The use of the term hysterotomy, very common in the seventies and eighties, but subsequently largely renounced, is too confusing to make practical use of at the present time. It could mean myomectomy or discission of the cervix for sterility, etc.

There is, however, not the slightest doubt that Pean, at least

on a few occasions, actually performed a vaginal hysterotomy, in the modern American sense, for the removal of intrauterine polypi or fibroids. In one case he states plainly that he split the corpus bilaterally for this purpose. Ordinarily he used a snare (?). This was in 1885. It is also certain that he performed in 1886 an "*explorative vaginal hysterotomy*" (his own language) in a case of metritis with false membrane. He split the cervix bilaterally for its entire length, and was able to recognize a decidua-like state of the mucosa of the corpus, for which he used the curet and thermocautery.

Traite d'Hysterotomie et d'Hysterectomie par la Voie Vaginale; *Secheyron*, Paris, 1889.

The first 400 pages of this large monograph relate entirely to vaginal hysterotomy. The author makes no attempt to trace the history of the procedure save through case histories. It may be used for diagnosis or therapy. There are two divisions:

1. *Cervical Hysterotomy.*—This is simply discission of the cervix, a general resource for diagnosis and therapy of affections of the cervix, of special utility in plastic work after tears, etc., and for overcoming atresias. This section may be passed over as not pertinent to the subject.

2. *Hysterotomy of Cervix and Corpus—Hysterotomy Proper.*—This subject is a new one. The operation is useful as a simple diagnostic procedure, may be applied to the treatment of uterine deviations with dysmenorrhea, and sterility. It is also applicable for the removal of fibromas, especially the interstitial, in polypous inversion, in fibromata during pregnancy, and in cystic collections, abscesses, etc., within or near the uterus.

Manuel Complet de Gynecologie. Lutaud, 1900.

Hysterotomy for Fibromas.—By this term the author does not refer to myomectomy in the sense used by Kelly and others. He means an abdominal hysterotomy which consists of opening the uterus as in Cesarean section, and in extracting the tumor through the wound. Among those who have operated with success in this manner are Bouilly and Ricard. The latter he quotes from.

"After laparotomy, the uterus having been raised from the lesser pelvis and isolated with compresses, I make an incision along the median line. If the seat of the fibroma is known, the incision can be adapted to it, and when exposed it may or may not be necessary to open the uterine cavity in order to remove it. If the latter is opened before attacking the fibroma the lips of the incision are kept separated and the cavity wiped dry with aseptic compresses. Advantage is taken to curet the uterine cavity. Even if the fibroma can

be removed without the necessity of opening the uterine cavity this latter step must always be taken in order to permit drainage of the uterus and cavity left by the myoma. Curettage finished, the internal orifice of the cervix is dilated, and a drain inserted which drains both cavities into the vagina. This done, the uterus is sutured, usually one plane sufficing."

The author believes this to be an operation of the future.

Suprapubic Hysterotomy as a Means of Diagnosis and Treatment of the Uterus. Russell, in Johns Hopkins Hospital Bulletin, 1906.

This paper consists almost wholly of thirty-two case reports of this operation, the first of the series having been performed in 1897. There is no mention of any earlier article on the subject. The operations were performed by the authors, Kelly, Cullen, Ramsey, Miller and Stokes.

The author refers briefly to the vaginal exploratory operation. The wall of the anterior cervix and uterus is split after the anterior culdesac has been separated from the bladder. Through the opening thus made the finger may explore the uterus. This resource is, however, unsatisfactory in a certain class of cases.

The first case shows how the author was led to select the suprapubic route. A young woman had been curetted repeatedly for hemorrhage. Examination showed that the genitalia were normal. Dilatation and curettage were tried and fragments of necrotic polypi brought away. There was no permanent improvement, so that an exploratory laparotomy was made, the uterus brought out and covered with gauze. It was then split anteriorly in the middle line from fundus almost to the internal os. Several polypi were found in the uterine cornua at the entrances of the tubes. After the mucous membrane was removed and the polypi curetted away, the musculature was sutured and the uterus dropped back.

The indications for this operation had been somewhat as follows: If, in the course of a laparotomy, a uterus shows a suspicious enlargement, or if there has been unexplainable hemorrhage, an incision is made antero-posteriorly through the fundus and in front half way to the cervix. The entire thickness of the wall is divided, exposing the cavity for a distance of two or more centimeters. The mucosa can then be inspected and the finger used for exploration.

The operation is especially serviceable in cases of polypoid change in the mucosa at the cornua, which are not accessible to the curet when used through the natural passages. When a uterine hemorrhage exists which resists all treatment and of which the cause

is unknown, another indication is furnished by pedunculated myomata and small submucous fibroids which do not alter the contour of the uterus.

There is no analysis or even summing up of the thirty-two cases. In a number of instances the patients were suffering from severe local affections and the hysterotomy was done only as an accessory to one or more operations, including utero-suspension, appendectomy, anchoring of loose kidney, operation for hemorrhoids, myomectomy, removal of ligamentous cysts, rectification of malpositions, etc., etc. This is perhaps the reason the cases are not analyzed. There were no deaths, and since many cases of obstinate hemorrhage were cured the author is more than satisfied with the results of his operation.

Vaginal Hysterotomy—Schauta. Lehrbuch d Gynäkologie, 1907, pp. 430-31.

According to this author, by the term vaginal hysterotomy one understands the detachment of the anterior wall of the uterus from the vagina for the purpose of operative removal of tumors from the uterine wall. Under exploration of the uterine cavity we find mention only of dilatation and digital and instrumental investigation.

It, therefore, appears unlikely that the recent development in America of exploratory and therapeutic hysterotomy for intra-uterine affections, either vaginal or abdominal, was recognized by the German school when this book was written.

(This reference is of interest because hardly any other author of a systematic treatise on gynecology of recent years makes any mention of hysterotomy or metrotomy at all.)

Operative Gynecology. Kelly (not Kelly and Noble). 1909, vol. ii. p. 368.

"Following the initiative of my associate, W. W. Russell, I have a number of times performed hysterotomy; that is to say, an incision dividing the fundus of the uterus in an antero-posterior direction so as to expose its entire mucosa to view, in cases for which it was necessary for other reasons to open the abdomen. In several instances I have been rewarded by finding small submucous fibroid tumors which had caused considerable hemorrhage and which had not been detected either in an examination or curettage from below. The removal of the tumors, followed by closure of the uterus with interrupted catgut sutures, has been followed by complete relief.

Hysterotomy. Deaver, in Journal of American Medical Association, 1912; lix–xc.

While this article deals chiefly with Cesarean section, there are references to incision into the nonpregnant uterus. One case of incision into the womb is a case of toxemia of pregnancy and a similar one referred to in the practice of a colleague might be grouped under Cesarean section, but the duration of pregnancy is not stated, and there was clearly no prospect of expectation of saving the fetus.

In incising a uterus the prospect of finding an ovum is often present, as the operation would hardly be undertaken unless the uterus were enlarged. Thus the author mentions hysterotomy as a diagnostic resource in a question of soft, symmetrical myomatous uterus and pregnancy. The author would not operate unless morally certain that pregnancy was not present, yet would be prepared for the result should this chance be the case.

In December, 1911, he performed a hysterotomy of this sort. A diagnosis does not seem to have been made and laparotomy was chiefly exploratory. A tentative diagnosis of cyst of the left ovary had been made at one time. No menstruation for three months. Laparotomy showed a symmetrically enlarged uterus corresponding to three months' pregnancy. Some small subserous fibroids were removed. The uterus was then incised and a fetus found and removed.

In suspected cancer of the uterus, two cases, the author performed hysterotomy and found a polypoid state of the endometrium. He was able to curet intelligently. By the ordinary method repeated curettage often fails in these cases.

The author briefly describes his technic and states that the chief contraindication is infection of the uterus. In the discussion of this paper most of the members spoke chiefly of Cesarean section and had but little to say of hysterotomy of the other types.

Boldt believes in vaginal hysterotomy as a diagnostic procedure in suspected submucous polypi.

E. E. Montgomery, *loc. cit.* twelve years before had done a hysterotomy in a nongravid uterus of a young single woman. After *failure of curettage* he did a diagnostic hysterotomy at the fundus and found th *uterus filled with grape-like masses.* In this case he removed the entire womb. Two years later he incised another uterus and found pregnancy. This time he emptied the uterus through the incision. In a third case, while certain of pregnancy, he incised the fundus and found none.

Goldspohn does not believe in opening the abdomen in these cases. Vaginal hysterotomy should answer all requirements, unless it has become necessary to do laparotomy for some other indication.

C. S. Bacon and R. B. Hall seem to think it pernicious to teach hysterotomy as a diagnostic procedure, as the method of choice in placenta previa, etc. They protest against any endorsement of the procedure by the American Gynecological Society.

S. M. D. Clark spoke well of hysterotomy, which he credited apparently to Russell of Johns Hopkins, at least as far as the diagnosis of obscure cases of uterine hemorrhages is concerned. The author has found in this manner small submucous growths. One, a woman suffering from prolonged hemorrhage had been curetted in vain. Scrapings *pronounced carcinomatous;* referred to author for Wertheim's radical operation. Laparotomy revealed ectopic pregnancy; hysterotomy showed *normal endometrium.* The decidual cells brought away by the curet had been mistaken for cancer. (This case has already been cited in this paper.)

Cullen had recently seen a case of persistent hemorrhage of obscure character. Scrapings revealed no pathological state. He did not think hysterotomy indicated. But had the abdomen been already opened he would split the uterus under certain circumstances. Thus in one case where laparotomy was thought advisable for uterine tumor, he split the uterus and found the remains of an abortion. Hysterotomy is indicated in cases in which careful examination and curettage cannot be made, and the abdomen is already open.

Coe has recognized vaginal hysterotomy for some years as a valuable diagnostic procedure in select cases.

Deaver concluding mentioned the drawbacks of curettage, calling it a most dangerous procedure.

A résumé of cases met in our experience, together with lesions found, is as follows:

Early, symptomless pregnancy simulating soft myoma—two cases.

Cystic mole, curettage negative, two cases.

Decidual tumor pedunculated in fornix, curettage failing, three cases.

Incipient malignancy, two cases.

Hematometra following amputation of the cervix, one case.

Myomyxoma, three cases.

Fibromyoma, two cases.

Hyperplastic endometritis, recurrent, two cases.

Malformation of uterus, one case.

Degenerative metritis with persistent symptomatology, two cases.

Fibrosis uteri, five cases.

Adenomyoma, one case.

Curet trauma, one case.

To sum up: When is hysterotomy justifiable? still remains a question. I have grave doubts whether any one can answer this in pathological terms. One's personal pride in making a diagnosis without too much surgery should lead to a proper effort to obtain same through complete history, curettage, and perhaps the added opportunity of a manual examination of the uterus, but if by these means, particularly in chronic cases, one cannot be positive as to the contents of the uterus or of the condition of its substance, then in my opinion hysterotomy is not only justifiable but necessary.

DISCUSSION.

DR. HUGO O. PANTZER, Indianapolis.—The greatest diagnostic precision possible before operating shall always be the ideal of the surgeon. To the extent to which this paper leans to this, I endorse this paper most heartily. I regret the doctor said that, at present, there are still many practitioners so conditioned that they cannot have pathological scrapings examined. I take it that this is no longer a tenable ground. The man who does not reach out for equipment and cooperation necessary to have pathological tissues examined, falls short of doing his full duty.

Hysterotomy is now an established and recognized means of diagnosis. I have in mind the case of a woman, eighty-two years of age, who had hemorrhage thirty years after menopause. I did a vaginal hysterectomy, assuming I had to deal with cancer of the body. Subsequently I found that a nonmalignant polyp hanging from the uterine ostium of one tube was the cause of the uterine disquietude and hemorrhages. While the patient made an uneventful recovery, death might have followed the operation. The additional risk entailed by an hysterectomy, as compared with hysterotomy, in single instance may eventuate in the death of the patient.

DR. JULIUS H. JACOBSON, Toledo, Ohio.—I wish to report a case for what it is worth in connection with this subject of hysterotomy. I believe this operation is one destined to have a place in our work, and I feel sure that in cases of submucous fibroma a diagnostic hysterotomy will oftentimes save a uterus that would otherwise be removed by complete hysterectomy.

A case that occurred in my practice within the last six months illustrates some of the points Dr. Pantzer has made. This patient, thirty years old, was an unmarried woman who had severe uterine hemorrhages. We resorted to curettage and removed what we thought was the hypertrophic form of endometritis. We were not satisfied with the findings, so deliberately made a laparotomy and opened the uterus through the hysterotomy incision. I passed my finger into the uterus and was unable to feel anything. The interior of the uterine cavity was smooth. No pathology of any kind could be determined with the finger. We neglected in this particular case,

for some reason or other, to have a microscopic examination made of the uterine scrapings. In less than two months hemorrhage continued; I operated on the girl again and found advanced adenocarcinoma of the fundus of the uterus with involvement of the iliac glands. We did as complete an operation as possible.

This case illustrates you may put the finger on the interior of the uterus and not be able to determine the pathology present. It emphasizes the value of microscopic examinations of the uterine scrapings.

DR. ROLAND E. SKEEL, Cleveland, Ohio.—I believe the procedure advocated by Dr. Dickinson is valuable. I simply rise to make a protest against the statement made a number of times that removal of the uterus is unsexing the woman, also myomata are multiple instead of single and I wonder how much good is really done by myomectomy, multiple myomata being present, but the uterus not removed with the object of avoiding unsexing the woman. Unsexing means removal of the sexual organs, and I have never understood that the uterus was the essential sexual organ of a woman. The uterus, so far as bearing children is concerned, serves a useful purpose as a baby incubator; but that it has any other purpose, I am very doubtful. A study of comparative anatomy shows that nothing but oviparous animals carry a uterus for any sex purpose. Therefore, I protest against the idea that it is unsexing a woman to remove the uterus when in reality the ovaries are the essential sex organs in a woman, and not the uterus itself.

DR. MAURICE I. ROSENTHAL, Fort Wayne.—I have tried to indicate in this paper that all cases of cancer as they come for operation and late cancer and must be treated as advanced cancer. An operation of any kind for diagnostic purposes, which necessitates or involves the cutting of the cancerous tissue is dangerous. There is danger of infection from malignant disease. Unfortunately, the symptoms of malignant disease are late in manifesting themselves. Hemorrhage and foul-smelling discharge means breaking down tissue. When we have those symptoms, unfortunately, the case is already pretty well advanced. There are no early diagnostic signs of cancer.

I wish to report here a case of cancer of the uterus, in which we did a thorough curettage. Specimens were carefully examined, and a report of nonmalignancy made on the microscopic findings. The patient had a recurrence of the hemorrhage and a watery discharge within three or four weeks. A curettage was done again; her symptoms continued again in a week or two, and we resorted to hysterectomy. The clinical findings were those of carcinoma. I opened the uterus after removing it, and a professional friend of mine looked at it and said, "what did you remove that uterus for?" I replied, "because I think it is cancerous." It did not look as though it was cancerous. Nevertheless, that woman died within two years of general carcinoma. How much the curettage had to do with the general infection I do not know, but I suspect that I assisted materially in spreading the disease by my diagnostic curettage. As I

have said, our great weakness in cancer is our lack of means for making a diagnosis.

DR. JAMES N. WEST, New York City.—I should like to call attention to one point relative to the diagnosis of conditions in the interior of the uterus. I consider the doctor's paper very valuable, in that it calls our attention to a loose diagnosis which is not infrequently made. I deprecate what I see to-day as a tendency to make an operative diagnosis, and I think it is common, since operations have become so easy, to defer diagnosis until operation is made. This is what I call a loose method of diagnosis, and I believe there is room for most of us for a more careful study of the cases beforehand, and the procedure to which I desire to call attention along this line is a thorough dilatation of the cervix and uterus by means of sea-tangle tents, so that the uterus can be easily explored without the necessity of a hysterotomy. I have done this repeatedly and have been rewarded by making the diagnosis by the use of the sense of touch in the interior of the uterus. This can be done in thirty-six hours. I wish to call attention to that point and emphasize its importance in diagnosis.

DR. HUGO O. PANTZER, Indianapolis.—If I may be pardoned for adding to the remarks I have made, I would mention a point bearing on what Dr. Skeel has said. The easy decision of some operators to remove the uterus under similar conditions, when it is seemingly a useless organ, I cannot approve. I would maintain that the severance of nerves and vascular trunks which supply in common the uterus, the bladder, the rectum and the vagina, is not of indifferent effect upon the remaining organs. I would here cite the case of a woman, who, when first I saw her, had all her genitalia ablated three years before, for epilepsy. Although only twenty-seven years old, her vagina, bladder and rectum were atrophic, as by senility, and her attitude toward her husband and the male sex generally, was much like that of an aged woman.

DR. MILES F. PORTER, Fort Wayne.—I would like to second what Dr. Pantzer has said regarding the excuses that are sometimes offered for inefficient work. The hospital or the surgeon who is not equipped in every way to carry out all of the recognized diagnostic measures should get out of business.

I would like to say another thing regarding operation. If you or I or somebody else is asked to go over to Podunk or some other place to operate on a case of chronic obstruction of the bowel, or perhaps remove the uterus with a myoma, can you or can you not conscientiously do that? Is it giving your profession a fair chance? Is it giving the woman a fair chance? Is it playing square with yourself when you go over there and do it for what purpose? To get the money that there is in it and to keep the other fellow from getting it. (Applause.) If I believe it is necessary for a patient to come to the hospital, and I say to them, I want you to come here, and if they say they will not do it, then my reply is, I have quit doing business on the judgment of the laity, and that should be the attitude of surgeons the world over.

DR. DICKINSON (closing).—I tried to so express myself that you would not feel I was endorsing this operation as an exclusive dogma. I am not. However, I do feel there are times when we operate with the belief that we have carcinoma to deal with and yet it is not. Let us take the case mentioned by Dr. Pantzer. Evidently from his preliminary remarks he submitted the scrapings to a competent pathologist and reports came back immediately from the laboratory saying the disease was carcinoma, and accordingly he goes ahead and operates and finds it is not cancer. He got everything a man ought to have, and he found it was not carcinoma. He removed the uterus; he put the woman to that little extra operation of removal. I feel it is to a certain degree unsexing a woman to remove the uterus at any time, because there is a certain sympathy between the uterus and ovaries, and most people I think believe, I may be wrongly informed, that the ovaries begin to degenerate and change, so that after a few years a woman is in the same condition she would be if she had both the uterus and ovaries removed.

What Dr. Rosenthal said about the diagnosis of carcinoma, etc., only applies after you have exhausted every other method. The clinical symptoms in the case he spoke of, such as a bad, offensive discharge and continued hemorrhages, would lead any one to become suspicious, but it is the early cases we are after. We are calling on the public to come early so as to enable us to make an early diagnosis. You are not going to make it of symptoms if you are suspicious and have lost confidence in the curet. If you are in doubt about the diagnosis, as well as doubtful about the report of the pathologist, I would suggest that you split the uterus and make sure for the woman's sake.

THE LATER OPERATIVE TECHNIC IN THE TREATMENT OF CANCER, WITH SPECIAL REFERENCE TO CANCER OF THE BREAST AND UTERUS.

BY

MAURICE I. ROSENTHAL,

Fort Wayne, Ind.

NOTWITHSTANDING the earnest and well-directed efforts of so many and such able workers in this field, the true pathology of cancer is no more clear to us now than was that of tuberculosis before the discovery of the tubercle bacillus. The literature on this subject shows no such progress as does that on tuberculosis or syphilis, and, aside from such histological facts as have been established, leaves us nothing but observation and experience as our guide, both in the treatment and in the diagnosis of this disease.

In a recent paper before the American Gynecological Association, Hoffman presented the following statistics. "It is a safe estimate that in the United States the mortality from cancer is 75,000 and in the civilized world 500,000. There is an annual increase of cancer deaths of 2.5 per cent. Ninety and seven-tenths per cent. were deaths at the age of forty or over. Cancer in the male, twenty-five years and over, had increased 29 per cent. during the last decade, and the female cancer deaths had increased 23 per cent. The cancer death rate of large American cities had increased from 37.2 per 100,000 population during the five years ending with 1876 to 80.5 during the five years ending with 1911."

It is probable that cancer is increasing. It is even possible that it is increasing in the alarming ratio shown by the foregoing statistical conclusions. We must consider, however, that our diagnoses are much more correct than they formerly were, and that many cases, such as catarrh of the stomach, catarrh of the bowels, liver diseases, even malaria and many other conditions, are now correctly diagnosticated as cancer. It is probable that a statistical review of cancer since 1876 would not be much more reliable or convincing than would a statistical review of tuberculosis for the same period of time. With our present knowledge of the disease, our only hope in checking this alarming mortality is surgical intervention as early as a diagnosis can be made. So long as the cause of this disease

remains unknown to us, so long as there is no physiological, or bacteriological, or diagnostic reaction or sign at our command whereby an early positive diagnosis can be made, so long will the full measure of our success in the treatment of this disease be deferred. With the full recognition, however, that cancer, as did tuberculosis

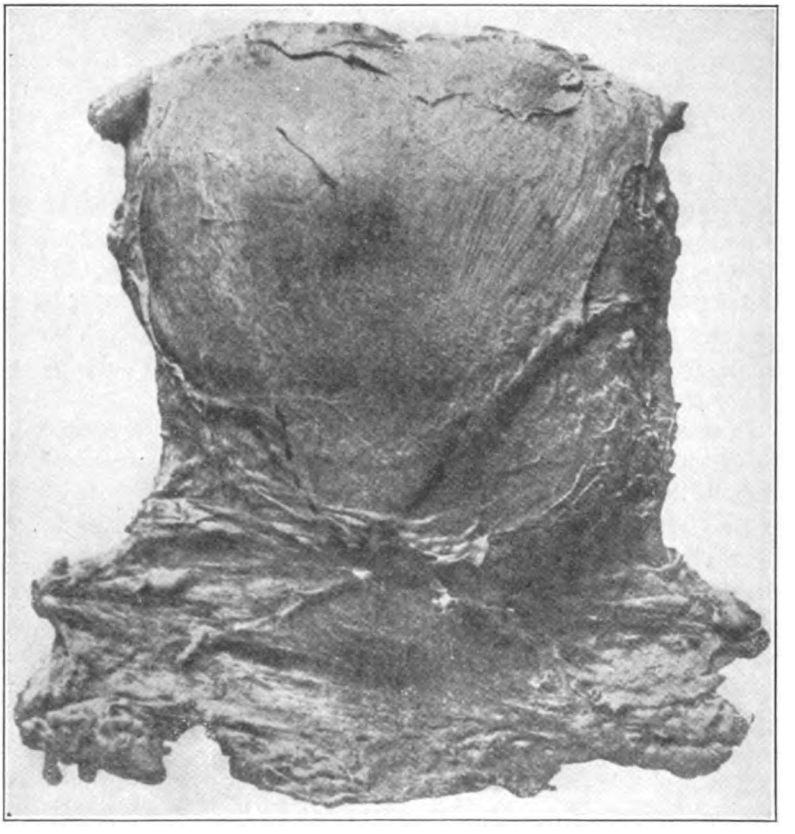

FIG. 1.

formerly, comes to us with very few exceptions already in its advanced state, and with the recognition that cancer is highly infectious, much can be done to render statistics more hopeful. In other words, a careful observance of the principles which should govern our technic in performing radical operations for cancer will do much toward making our results more satisfactory.

It is just as important that the surgeon should appreciate the high degree of infectiousness of cancerous tissue as it is that the

practitioner should recognize any symptom which is significant of this disease. The radical operation has demonstrated that infiltration and glandular enlargements, apparently cancerous, are frequently inflammatory in character, and that cases apparently inoperable by reason of such extensions, are readily operable by this

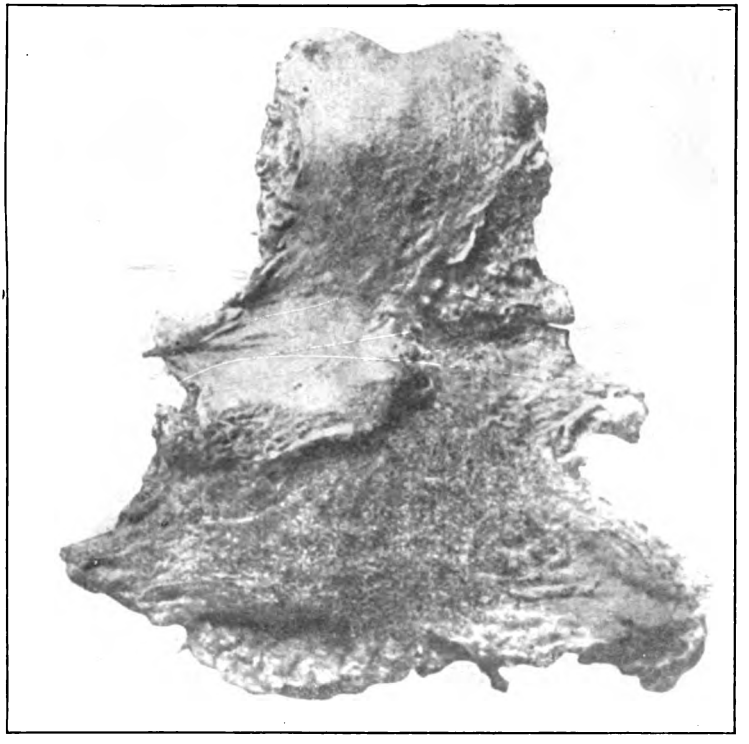

FIG. 1a.

technic. As a result of this greater operability, the primary mortality following this greater technic must be considered when estimating its true value.

The term "*recurrent carcinoma*" is a misnomer and misleading, in that it does not express what actually occurs. What does actually occur in a vast majority of cases is one of two things. Either some of the cancerous tissue has escaped removal, or cancerous tissue has been disseminated or implanted in the wound by the manipulations of the operator. The possibility of cancer dissemination by extrusion of cancer infection into the circulation, as a result of injudicious and rough handling of the growth, should not be lost sight of.

I have here a specimen of implantation cancer which I have taken the liberty of presenting to you. Not that this condition is rare, but because this is a particularly instructive case. This specimen

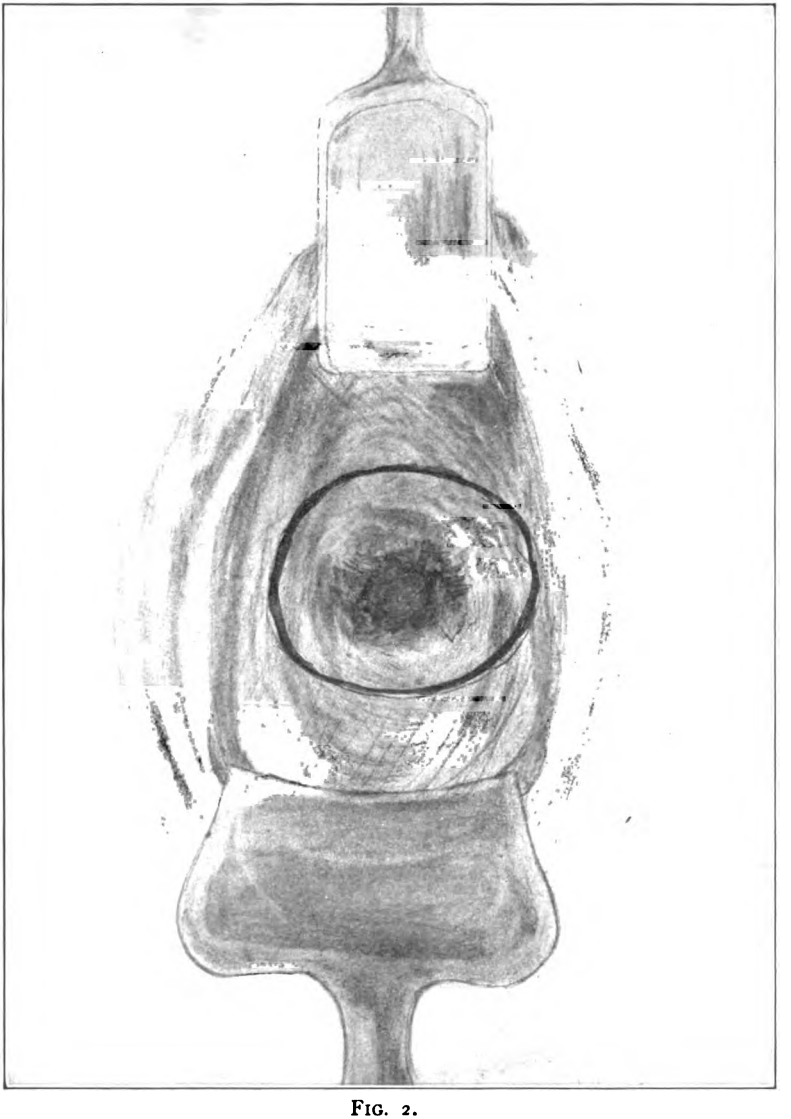

FIG. 2.

was excised from the abdominal wall, including the scar from a previous operation in the near median line on the left side. This patient gave a history of having undergone an operation for can-

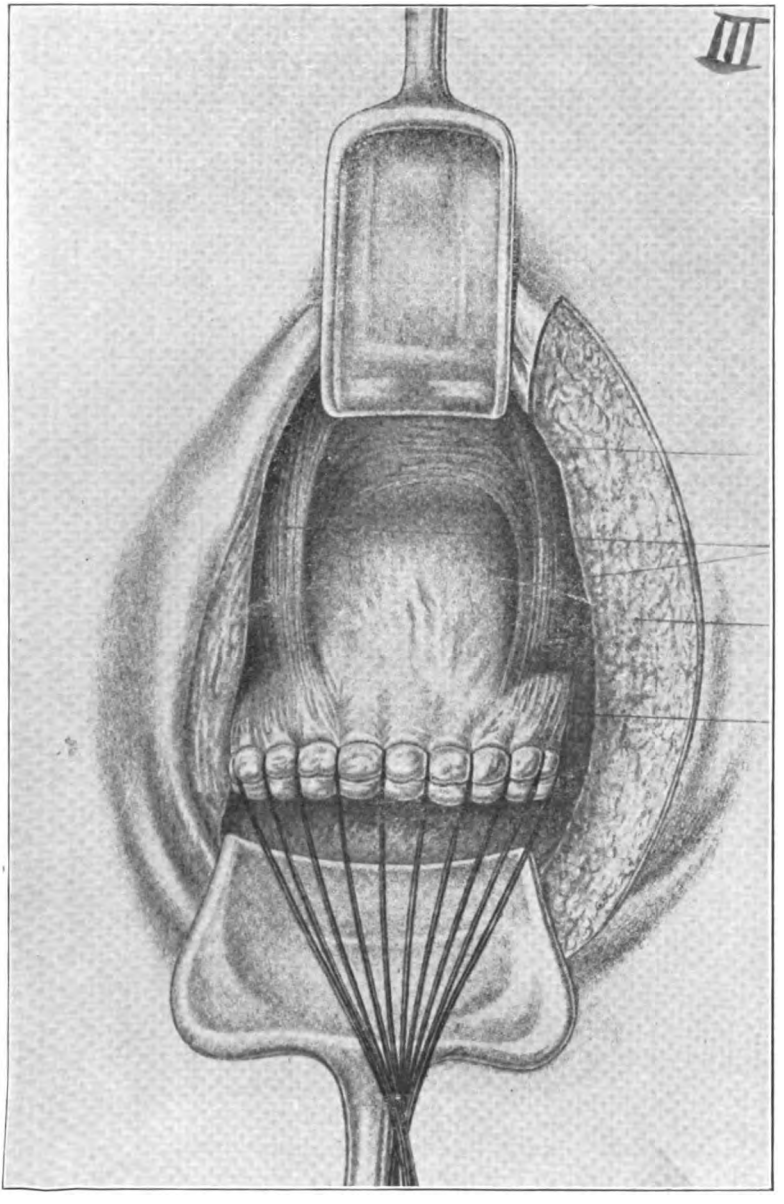

FIG. 3.

cerous obstruction of the rectum and sigmoid a few months previously. There were no adhesions of the bowel nor of omentum to the peritoneum. The peritoneum is not involved. This is a case where the manipulation of the cancerous bowel during resection infected

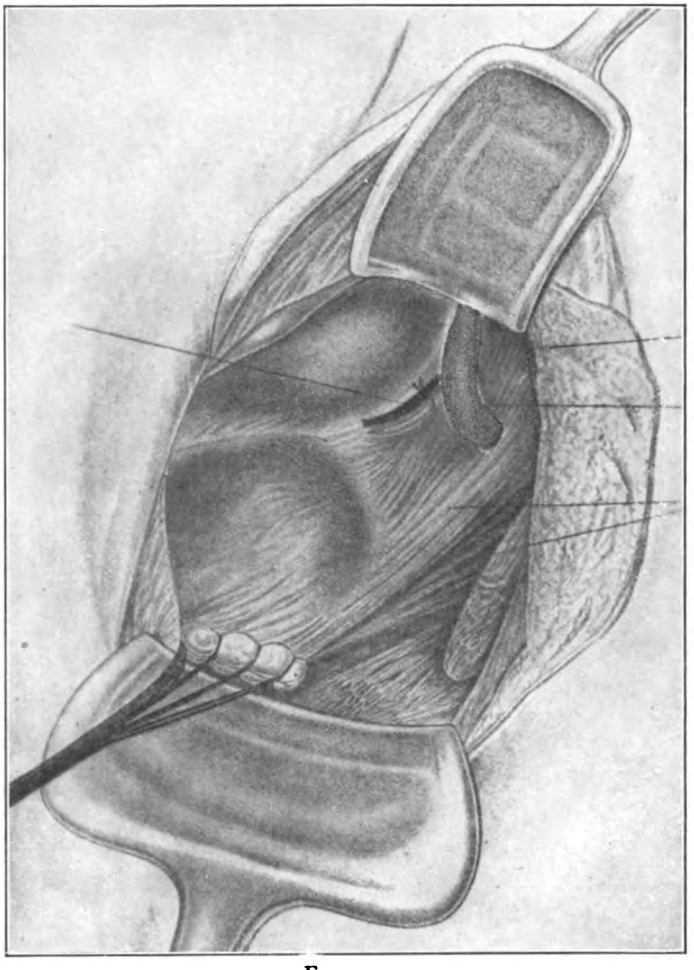

FIG. 4.

the abdominal incision through which the operation was being performed.

The older surgeons recognized the danger of puncturing, for diagnosis, apparently fluctuating tumors when they were probably malignant, for fear of rapid growth after such treatment. The danger

of rapid growth after partial removal of cancer or after cutting a piece out of it, is not apparent, it is real. The small excision for diagnosis, as usually practised, is a procedure which is far from

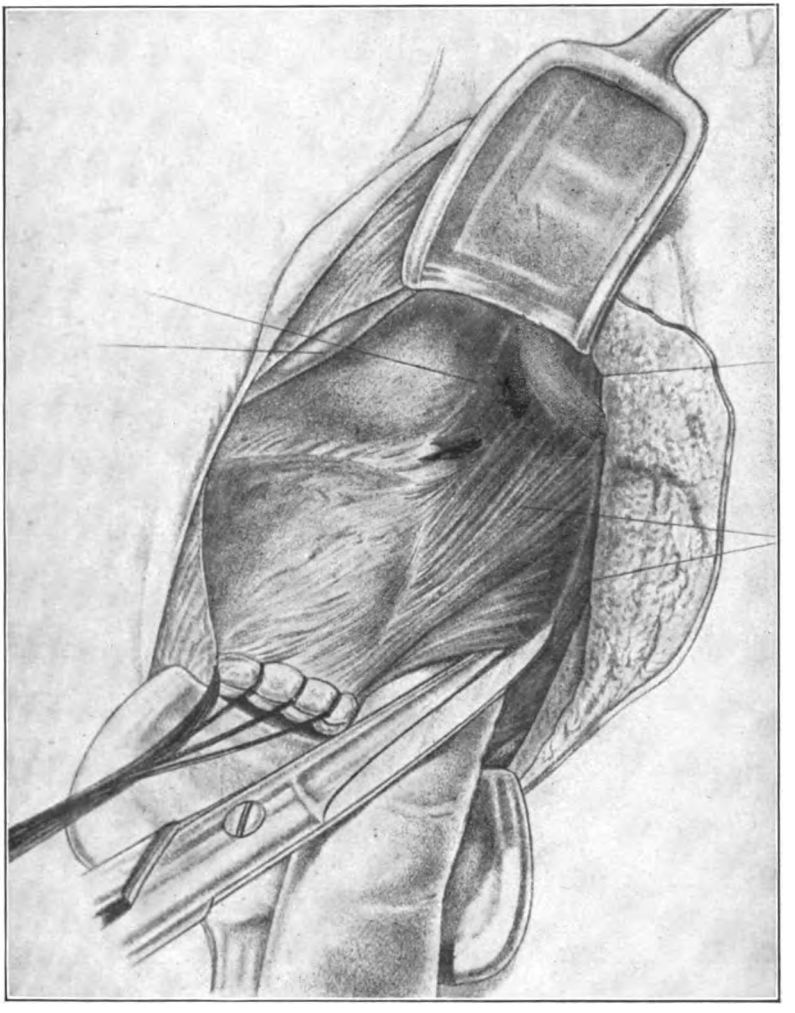

FIG. 5.

harmless. Such excisions, unless entirely in healthy tissue or unless immediately followed with actual cautery are liable to give rise to dissemination of cancer.

With the exception of certain epitheliomata, it was in cancer of

the breast that something like a reasonable result from operative procedure for cancer was first obtained With some little changes in the technic of this operation we have obtained results, which, compared with cancer in other regions, might almost be called satisfactory. We may take the technic of this operation, which embodies all that goes to make up the later operative technic of this disease, as a technic typical for operation for cancer in other organs.

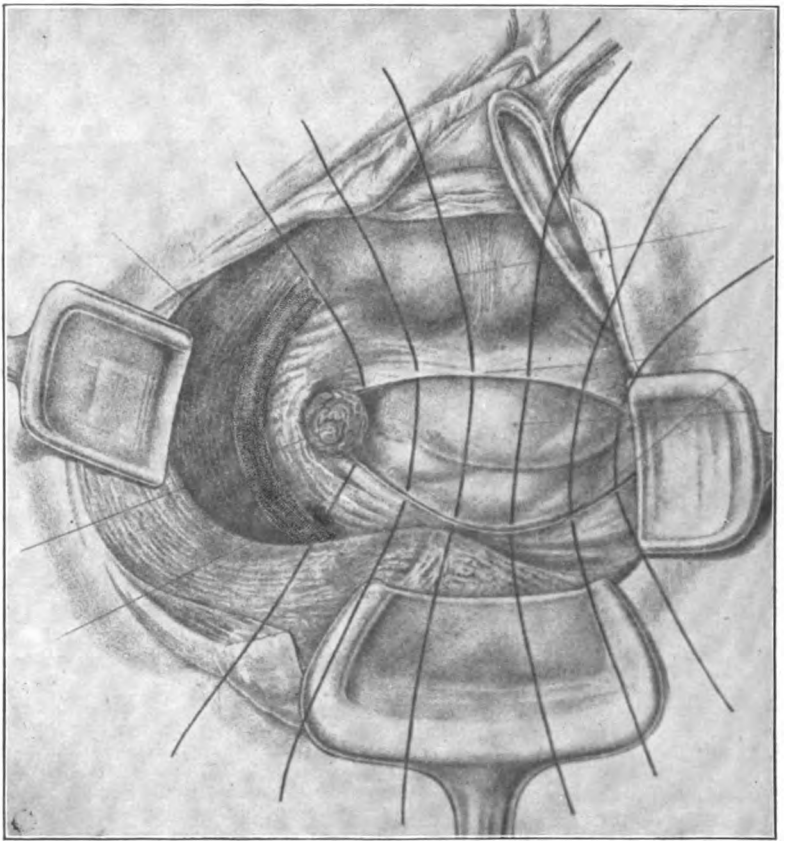

FIG. 6.

It is unnecessary for our purpose to describe in detail the well-known radical operation for cancer of the breast; but rather to point out such steps in the technic as have a tendency to make the operation more successful. While we are aware that sharp excision has been recommended, it has been our practice, after dividing the skin, and the underlying fat with the knife or scissors (with the excep-

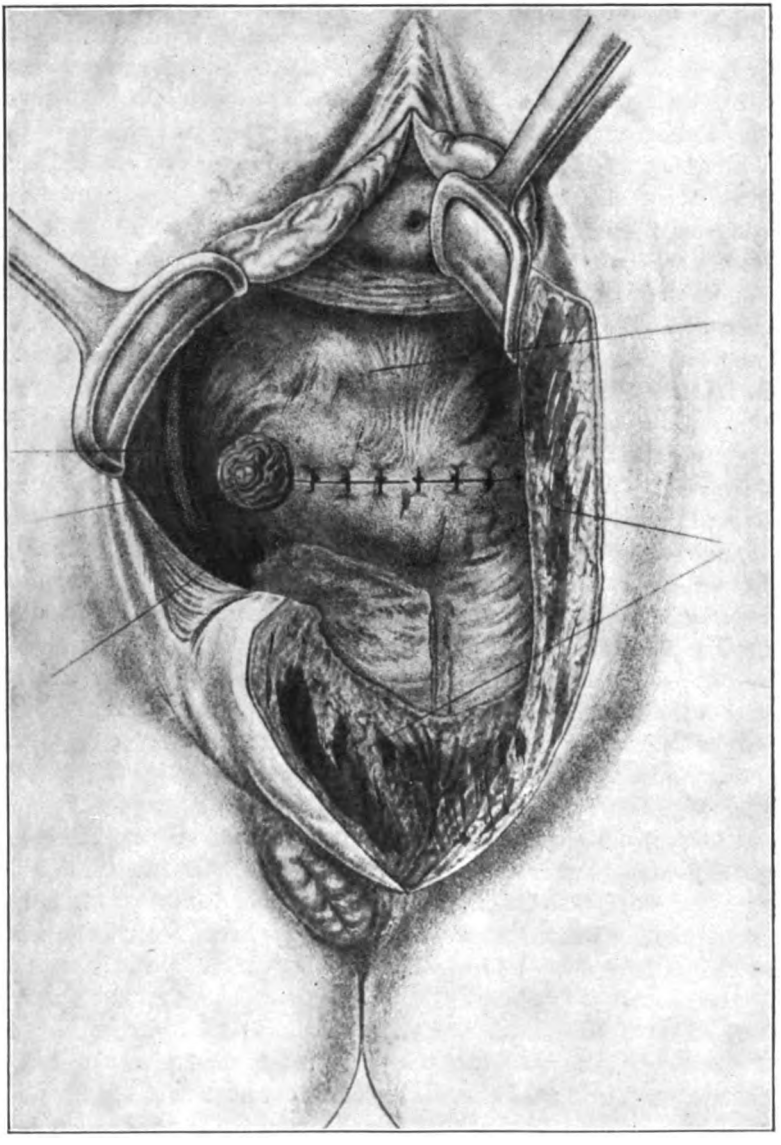

FIG. 7.

tion of the division of the pectoralis muscles), to finish the operation as much as possible without use of sharp instruments. We endeavor to leave sufficient pectoralis muscles to cover the axillary vessels and to fill in the axillary space so as to avoid edema of the arm from scar pressure on the vessels. All glandular tissue, as well as the breast itself, with its sublying muscles, is removed by evulsion. This not only secures against opening carcinomatous tissue, but is followed by a minimum of hemorrhage. As a rule, only one or two, and frequently no hemostats are required after tearing the breast and muscles from their attachments. The carcinomatous glands themselves have a well-marked limiting capsule which does not so easily tear, but which is easily cut into. Gauze dissection should be carried on carefully and with due appreciation of the danger of opening carcinomatous atria. The aim in resecting the glandular structures should be to make the breach between the healthy structures and the cancerous structures as great as possible. The glands lying along the long thoracic vessels should not be overlooked. The wound should be closed by plastic flap from the side or from the abdomen. The opposite breast may be mobilized and made to assist in closing the wound. The patient is x-rayed immediately after the operation. I have been able to gather the end results in fifty-two cases of my own experience, by having the patients present themselves in person or by having my assistant go to see them and by letter from their physicians. Of the sixty-two cases up to date, including cases operated within the last year, there was no primary mortality. Of the fifty-two cases operated from one to thirteen years, thirty-seven are still living, and fifteen are dead. Of the twenty-five cases operated up to 1908, eighteen are still living. It is possible that a number of cases not heard from might reduce this unusually good result. It is also possible that a larger series of cases would reduce the percentage of cures. I do not insist on these statistics of my own, except in so far as they indicate that our working theory has been correct. Several of the patients who died of cancer lived over five years after the operation.

In Cases II, XII and XX of this mortality list, a history of simple breast amputation was given with evidence of dissemination of carcinoma, and in all these cases a prompt continuance of the growths was noted following our radical operation.

Case XX. Had had a simple amputation of the right breast and presented herself with a continuance of the growth, for which a radical operation was done. The left breast, also cancerous, was

removed by the radical operation. The right breast continued to develop the disease, while the left remained free from cancer.

Case XXVII. Was treated with cancer paste eight years before the development of a regrowth in the same breast. She lived three years after the radical operation. She died at Hot Springs, Ark., and I am told by her son of other disease (nephritis). However, I have credited her case with having internal metastasis.

Cases II and III of this series will serve to illustrate what may be accomplished even in apparently hopeless cases.

Case II.—Lima, Ohio, aged sixty-two. Operated, 1904. Referred by Dr. Laudick. Immense cancerous mass in left breast; unusually large glandular involvement of axilla. Broad infiltration of skin. Operation undertaken with no hope of permanent result. Plastic closure. Present condition, nine years after operation, reported by Dr. Laudick, Lima, Ohio, patient in excellent health; no regrowth.

Case III.—Chicago, Ill., aged thirty-seven. Operation St. Joseph Hospital June 7, 1905. Large open foul discharging cancer of right breast. Breast fixed to chest wall; marked involvement of axilla and supraclavicular glands. Case declared inoperable in Chicago as well as by myself. Operation undertaken under protest with the view of removing stinking breast mass. Axillary space and supraclavicular space successfully cleaned out. Clavicle resected. Gland size of "lima bean" finally detached from the subclavian. Large skin defect closed by plastic from opposite chest, back and abdomen. Wound healed by first intention. Recovery. Patient lived five years after operation, four and one-half years in good health. Cancer redeveloped in mediastinum and in former operation scar.

There is a similarity both in the technic and in the operability in radical operations for breast cancer and for uterine cancer.

The case of Mrs. N., Chicago, Ill., advanced cancer of cervix, illustrates some of the possibilities of the greater vaginal operation for cancer of uterus. Operation St. Joseph Hospital, Nov. 2, 1910. Patient forty-three years of age. Duration of symptoms about one year. Cervix broken down, bleeding profusely on touch. Posterior vaginal wall involved in cauliflower growth. Uterus firmly fixed in pelvis. The vagina and cervix were involved to such an extent that in the preliminary excochleation, Douglas' culdesac was opened through the posterior cervical and vaginal wall.

The opening in Douglas' culdesac was packed with gauze, the cuff formed and sutured, and the typical operation proceeded with. The ureters were easily brought into view, and a broad excision into the parametrium made. Patient returned one year after

operation. Examination revealed the remaining vagina, loose and free from infiltration. Patient gained 24 pounds in weight. Two years and four months after operation patient presented herself for treatment for pain in epigastrium and stomach disturbance. Vaginal examination still negative. Diagnosis: gall-stones. Three stones were found in the cancerous gall-bladder. Stomach and liver were involved. Patient died Aug. 1, 1913. No postmortem was allowed. Examination of abdominal viscera at the time of gall-stone operation led to a diagnosis of primary cancer due to gall-stones and not metastasis from pelvis.

The parametrium pierced by the ureters and carrying the lymph and blood-vessels bear the same relationship to the uterus in this disease as do the axillary structures to cancer in the breast. With the exception of cancer of the body of the uterus, the simple removal of the uterus for this disease gives about the same result as that which was obtained by simple removal of the breast in cancer, a result which was anything but encouraging. Simple cauterization, by reason of its lesser danger of dissemination, gave even better results than simple hysterectomy; just as cancer paste gave just as good or better results in cancer of the breast than did simple excision of the gland.

The ureters are the only important structures in the parametrium which need to be feared. In simple vaginal hysterectomy it is necessary to hug the uterus closely for fear of wounding or ligating these structures. In fact, the operator who would make his excision anywhere but near the uterus was recklessly bold. With the recognition of the fact that all symptoms of cancer of the uterus are late symptoms; that all operations for cancer of the uterus are late operations; with the recognition of the extreme infectiousness of cancer, we need not be surprised in finding that operations for cancer of the uterus gave very discouraging results.

With a view to establishing an operation similar to the radical operation for cancer of the breast, Wertheim developed his radical abdominal operation which consists in laying bare the ureters from the point where they cross the iliacs to their insertion into the bladder and laying bare the lymph glands in the pelvis. With the ureters in sight the uterus with its parametrium was removed together with the vault of the vagina and, when necessary, part of the bladder or rectum all in one piece. The enlarged glands in the pelvis were also removed. The incision was carried through the parametrium well up to the pelvic wall. Very early in the history of this operation it was noted that in those who died as a result of a continuance

of the disease the abdominal and thoracic organs showed involvement. The structures about the vagina as well as the vaginal scar remained free in marked contrast to the usual experience. It later developed that the enlarged glands in the pelvis were very frequently inflammatory and not cancerous, and that when these glands were cancerous the case usually went on to further development of the disease higher up, so that the advantage of this operation remained in the complete and broad resection of the parametrium and vault of the vagina as far as possible from the cancerous tissue itself. This operation also developed the fact that many cancerous uteri which were fixed in the pelvis, apparently hopelessly inoperable, were so by reason of inflammatory and not cancerous adhesions. Many of these cases were readily operable by this method. As a preliminary step to the operation, the cervix is thoroughly curetted with a large sharp curet and thoroughly cauterized by actual cautery (excochleation) to prevent infection and dissemination by implantation. In the course of the operation this entire area is closed off by the use of angular clamps. The advantage of the Wertheim operation accrued from the laying bare of the ureters through the parametrium to their point of insertion into the bladder. Since it has been found that the removal of the pelvic glands is not essential to the result of the operation and since the greater vaginal hysterectomy as devised somewhat later by Schauta accomplishes the broad excision of the parametrium and vault of the vagina with the ureters in view of the operator, we have abandoned the abdominal for the vaginal radical operation, in that the latter operation carries with it a lesser mortality and still permits an excision approaching the thoroughness with which the cancerous breast may be removed.

Most of these illustrations are taken from Prof. Schauta's original drawings which very nicely demonstrate the operation.

Fig. 1 represents two specimens removed by the Schauta greater vaginal hysterectomy. I draw your attention to the broad excision through the lateral limits of the parametrium as well as the considerable excision of the vault of the vagina. You will note here, that the ovaries and tubes are not removed. Cancer of the cervical portion of the uterus does not produce metastasis in the tubes and ovaries; cancer of the body of the uterus is a comparatively benign affair and does not call for such an extensive operation as we are describing. I may mention, however, that in cancer of the corpus uteri, the tubes and ovaries should be removed and the operation ordinarily done by simple vaginal or abdominal hysterec-

tomy. I may here add that in simple vaginal hysterectomy I have substituted the cautery for the knife or scissors.

Illustration No. 2 illustrates the first step in the operation. At the location of the cervix we have endeavored to show a deep charred crater. The preliminary step in the operation consists in a very thorough curettage with large sharp spoon, followed by an extensive and thorough actual cauterization. A circular line is now marked off in the vagina with a sharp instrument and at intervals of about an inch along this line a series of volsella catch up the mucosa in such a way as to facilitate the resecting of a cuff or circular flap. This line is ordinarily placed at the junction of the middle and upper third of the vagina. If the vagina itself is involved, this cuff should be started much lower down. If necessary, as low as the vulva, so that the entire vagina will be removed. This vaginal cuff is now resected upward from its sublying cellular tissues to about the level of the cervix.

Illustration No. 3 shows the completion of the first step in the operation and the beginning of the next. The cuff which has been resected is now sewed together by several interrupted sutures, the ends of which are left long and tied together to serve as a tractor. All instruments and gloves used in the operation up to this time should now be discarded. You will note that we have from now on a thoroughly aseptic field for operation. The carcinomatous tissue is effectually inclosed in the sutured flap or cuff.

The next step in the operation is the freeing of the vagina and cervix from the bladder, which is accomplished in the ordinary manner by blunt or gauze or finger dissection. You will note here illustrated in Fig 3, what Schauta calls or terms the "Blasenzipfel." We will call them "bladder columns." They are reflected, as you note, from the bladder to the sides of the cervix and are implanted in the parametrium on either side. Under these columns will be found the ureters, which are the "corpora delecti." If it is now found that the bladder itself is too thoroughly involved in the cancer, or if conditions unforeseen present themselves which make the case inoperable, the operation may be abandoned at this time and excision with excochleation of the cervix substituted as a palliative measure.

We will now proceed with the next and most important step in the operation, Illustration No. 4, the laying bare of the ureters. We now carefully dissect backward the previously described "bladder columns" largely by blunt dissection, from their insertion in the parametrium. In the course of this dissection the ureters are

brought to view as they emerge from their slit in the parametrium, first on one side, and then on the other. To facilitate this manipulation and to make the structures easily accessible, the Schuchardt incision is made extending from the lower apex of the lesser labium through the perineal structures to the side of rectum. A flat gauze pad placed on this incision and retraction with a speculum with the assistance of a few ligatures checks the hemorrhage from the same. The ureters are now dissected from the parametrium. This is ordinarily accomplished with the finger. Sometimes, if they lie in cancerous tissue, they may require careful instrumental dissection. Ordinarily, though surrounded by cancerous tissue, the ureters themselves are free of cancer. The uterine vessels now plainly in sight lying back of ureter are ligated as high as possible. It is sometimes remarkable how a retracted parametrium now becomes mobilized.

Douglas' culdesac is next opened broadly in the usual manner. Protecting the rectum with the finger, the ureter all the while in sight (Fig 5) the parametrium on the left side is divided well up to its bony attachment. Ordinarily a branch of the median hemorrhoidal is divided in this step of the operation and should be ligated. The parametrium on the right side is treated in like manner. If the anterior uterine space through the peritoneum has not been opened, this should now be done. The uterus is now hanging by its broad ligaments only; the broad ligament is divided between the ovary and uterus on either side. The ovaries and tubes are not removed.

Fig 6. The abdomen is now thoroughly and carefully closed by suturing the peritoneum, making the ovarian stumps extraperitoneal by fixing them in the lateral angles of the peritoneal slit, as in Fig 7.

The paravaginal cellular tissue is now loosely packed with several strips of gauze. The Schuchardt incision is closed as in ordinary perineorrhaphy. The gauze strips should be removed, beginning about the eighth day, removing one strip at a time each day, as the paravaginal tissues contract rapidly and may otherwise form a blind pouch locking up or favoring infection.

A search of the literature on cancer of the breast and cancer of the uterus, reveals the following statistics.

WERTHEIM OPERATION.

Schindler (R.). Statistische und Anatomische Ergebnisse der Wertheimschen Radikal Operation des Uterus Karzinoms. *Monatschrift f. Geburtshülfe u. Gynaek.*, Berl., 1906, xxiii, 78; 371, 502.

Abstract.—Looking up the literature, the experiences of the Wertheim operation have so far been rather scanty.

Winter reported at the Congress of Giessen on 108 cases collected from the literature, of which, with a primary mortality of 24.6 per cent., 45 (41.6 per cent.) relapsed during the first year.

Funke reports from Freund's clinic eleven cases, of whom two died; five remained well five years after the cperation.

Freund reports on fifteen cases, with two deaths, from injuries to ureter; five died of relapse; three showed local relapse. Three cases of cancer confined to uterus remained well, one case more than two years.

Pfannenstiel and Kroemer had from 1899–1907, three deaths and three relapses (number of cases operated not mentioned).

Zweifel reported in 1902 a primary mortality of 15 per cent.

Jacobs reported in 1900, fifty-two cases, with four deaths, and sixteen deaths from relapse, and sixteen others relapsed. Later he reported on seventy-five cases, with twenty-eight permanent cures (37 per cent.).

Morisani reports on fourteen total extirpations, with one death, one relapse after eight months; ten cases have so far remained well.

Gattorno had of eighteen cases, two deaths, two relapses, of which one died.

Jayle in Paris reports on nine cases, three deaths, six relapses.

Kleinhans of Prag reports on thirty-two cases, three deaths, three relapses.

During the last two years (1904 and 1905), appeared the following reports:

Wertheim had of fourteen cases (one series) 29.2 per cent. operable cases; had after four years' observation nine cases free from relapse (18.5 per cent). Furthermore, he had thirty-one cases (three years) 34 per cent. operable cases, nineteen remained free from relapse (27.5 per cent.). Also forty-three cases (two years), operable cases, 51 per cent., twenty-six remained free from relapse (31 per cent.).

At the Congress at Breslau, Wertheim reports absolute cures in 18.2 per cent. after four years' observation, but his primary mortality is still 17 per cent.

At the Congress at Kiel (1906) he states that most of his relapses occurred during the first two years and he estimates the absolute cures at 11 per cent. after five years' observation, 23.4 per cent. after four years' observation, 25.8 per cent. after three years' observation, 24.4 per cent. after two years' observation.

Pankow reports at the Congress at Breslau on cases operated partly

after Koenige, partly after Wertheim, a primary mortality of 26.7 per cent.

Bumm reports on seventy-five cases, of whom fifty-six were under observation for more than one year. Ten patients died of the operation; of the other forty-six, eleven have already died of relapse, six are still living with relapse, six could not be heard from; thus twenty-three are still living without relapse (twenty of them after two years); therefore, 50 per cent. cure with an operability of 90 per cent. and a primary mortality of 17.85 per cent. (total mortality 24 per cent). He hopes to reach at the most favorable estimate an absolute cure of 30 per cent.

Döderlein reports on 115 Wertheim operations; an operability of 65.7 per cent. and a primary mortality of 16.5 per cent. (after one and one-half to two and one-half years' of observation), twenty cases free from relapse, which would give a permanent cure of 44 per cent. (calculated according to the method of Winter).

Author's own cases operated at the Graz clinic. In all 117 cases; of these sixteen died (13.6 per cent. for all cases). If only the cases operated up to 1903 are considered, we get a mortality of 15.21 per cent.; for the cases operated to 1902, 17.18 per cent. mortality, and for the cases operated up to 1901 a mortality of 7.4 per cent.

The causes of death were: collapse, peritonitis, sepsis, thrombosis of right pulmonary artery, fatty degeneration of heart, anemia, dilatation of heart, etc.).

Permanent results of the 101 cases surviving: twenty cases could not be heard from. Of the eighty-one cases remaining, observed from one to five years after operation, five died without showing relapse.

The author then mentions thirty-three cases operated by Rosthorn, Kermauner and Lameris. Of these thirty-three cases, three died of the operation (a primary mortality of 9.09 per cent.), five could not be heard from, leaves twenty-two cases. Of these we get 77.2 per cent. relapse and 22.7 per cent. permanent cure.[1]

The operability of the vaginal cancer operation has increased during the last eleven years. The total operability of the eleven years amounts now to 54 per cent., but in the last three years it reached from 60 to 70 per cent.

In 1911, forty cases were operated by the abdominal operation. The mortality was 7.5 per cent. (4.53 op.).

[1] F. Schauta. Bericht über das 11. Beobachtungsjahr der erweiterten vaginalen Krebsoperation. *Monatschrift Geburtsh. u. Gynæk.*, Berl., 1912 xxxiii, 202–207.

The total mortality for the eleven years is now forty-four; 498, that is, 8.8 per cent. If only the last four years are considered, we get ten deaths of 212 cases, *i.e.*, 4.6 per cent.

TABLE OF OPERABILITY.

Year	No. cases	Abdom. operation	Refused operation	Op., Schauta	Per cent.
1901	116	.....	9	47	43.9
1902	95	.....	8	29	33.3
1903	88	.....	6	37	45.1
1904	96	.....	6	49	54.4
1905	83	1	4	49	62.8
1906	93	6	2	47	55.2
1907	84	13	.....	28	39.4
1908	94	4	4	50	58.1
1909	88	2	2	59	70.2
1910	80	4	3	50	68.4
1911	90	10	1	53	67.0
	1007	40	45	498	54.0

As to permanent cure in the years 1901–1906, there were 258 cases operated; twenty-nine died of the operation, five of intercurrent disease; remaining 224 cases. Of these eighty-five are still well (after five years). This gives a percentage of permanent cure of 37.9 per cent. considering all those not heard from as relapses.

Note.—There is an article by Wertheim, entitled: "The Extended Abdominal Operation for Carcinoma Uteri" (based on 500 cases) translated from the German in AMERICAN JOURNAL OF OBSTETRICS, 1912, vol. lxvi, pp. 169–232. von Ott (D). Vergleichende Schätzung der verschiedenen Methoden der chirurg. Behandlung des Gebärmutter krebses (comparative estimation of the various methods). *Zentralblatt f. Gynäk.* Leipz., 1900, xxxiii, 1394–1406.

TABLE I

	Wertheim	Stande	Schauta vag.	Ott. simple vag.
Number of cases		104	162	277
Primary deaths		21	18	5
Per cent. of mortal		20.2	11.1	1.8

All these cases were operated in Ott's Clinic in St. Petersburg.

TABLE II

	Wertheim abd.	Stande vag.	Schauta	Ott. simple vag.
No. of cases operated more than five years ago.	116	58	47	191
Died of operation	27	9	9	4
Per cent. of mortal	23.3	15.5	19.1	2.1
Per cent. of operability	42.2	64.5 (72.3)	48.7	42.8
No. of cases surviving operation.	93	49	39	187
Cases excluded for various reasons.	6	2	4	0
Cases not heard of	0	6	0	35
Cases observed five and more years.	87	41	34	152
Of these without recurrence	51=58.6 per cent.	17=41.5	13=38.2	55=36.2
Winter's cases	24.7	23	16.7	15.5
Waldstein's	19.16	.....	13.5	15.1

These figures were taken from the most favorable reports of each operation.

CANCER OF BREAST.

Fidelin. Resultats eloignes de l'ablation du sein pour cancer' Paris thesis. 8.0 Paris, 1909.

Amputation Without Curetting Axilla

Kuster had 13.30 per cent. cures.

Hildebrand 30 per cent. cures.

Amputation With Curetting Axilla

Kuster 24.60 per cent. cures.

Of 600 cases operated by Schede, Carle Cheyne, etc., 168 were cured (27 per cent.).

Cestan collected in 1906, 642 cases, of which 333 had local recurrence or 52.6 per cent.

Amputation with cureting axilla, removing aponeurosis of pectoralis major and superficial layer of this muscle.

Barker obtained in ninety-two cases 33 per cent. cures, living more than three years, and 16 per cent., living more than five years.

Rosenstein had of 152 cases operated, 22.7 per cent. cures.

Sheild had of 60 cases operated 20 per cent. cures.

Cheyne had of 56 cases operated 48.6 per cent. cures.

Halsted had of 161 cases operated 42.8 per cent. cures.

Halsted 10.5, local recurrences.

STATISTICS OF THE MASSACHUSETTS GENERAL HOSPITAL.

From 1 to 6 months	Cures 20 per cent.
From 6 to 12 months	Cures 16.6 per cent.
From 1 to 2 years	Cures 24 per cent.
From 2 to 15 years	Cures 24 per cent.

RESULTS OF THE TWO METHODS.

Cures for the complete operation.....	16 per cent.
Cures for the incomplete operation.....	25.9 per cent.
Cures for the half complete operation....	25.3 per cent.

The Massachusetts surgeons explain the inferior results of the complete operation by saying that it reverses the limits of operability.

Greenough, Channing, *et al.* End results of 376 primary operations for carcinoma of the breast at the Massachusetts General Hospital from 1894–1904. (*Ann. of Surgery*, Phila., 1907, xlvi, 20–27.) Of the 376 patients operated, sixty-four are now alive at a period of from three to thirteen years. Complete operations were performed in 160 cases; in this group are included all operations in which the whole breast, axilla contents, and sternal portion of the pectoralis major were removed. Of the 160 cases operated 16 per cent. were successful in preventing recurrence of the disease. In twenty-six of the 160 cases the neck was dissected and lymphatic glands removed, but only in one case in which the glands removed were infected was the operation a success in preventing a recurrence. *Semicomplete operations* were performed in seventy-five instances (in these cases the pectoralis minor was not disturbed); 25 per cent. remained free from recurrence. *Incomplete operations* (pectoralis major was not removed), twenty-two cases or 25.9 per cent. remained free from recurrence.

Ochsner.—Final results in 164 cases of cancer of the breast. (*Ann. of Surgery*, 1907, xlvi, 28–32.)

Fifty-four cases are still living.

Time since operation,	1 year, 9 cases.
Time since operation,	2 years, 11 cases.
Time since operation,	3 years, 5 cases.
Time since operation,	4 years, 7 cases.
Time since operation,	5 years, 4 cases.
Time since operation,	6 years, 5 cases.
Time since operation,	7 years, 4 cases.

Time since operation, 8 years, 1 case.
Time since operation, 9 years, 3 cases.
Time since operation, 10 years, 1 case.
Time since operation, 11 years, 2 cases.
Time since operation, 13 years, 2 cases.

R. Bereck.—"Resultate der in den letzten 5 Jahre an der chir. Klinik zu Greifswald operierten Fälle von Mamma Carcinom" (Thesis) Greifswald, 1899; sixty-four cases were operated by the radical operation. Only fifty-five cases could be heard from.

1. Without local recurrence still alive after three and more years..... 8 or 24.2 per cent.
2. Without local recurrence:
   (*a*) Died of intercurrent disease..... 3 or 9.1 per cent.
   (*b*) Died of inner metastases..... 7 or 21.2 per cent.
3. Without local recurrence.
   Total of 1 and 2..... 18 or 54.5 per cent.

Résumé of results during the five years of fifty-five cases:

1. Without local recurrence are still living, 20 or 36.4 per cent.
2. Without local recurrence, died of intercurrent diseases.....4
   Died of intercurrent diseases and internal metastases.....12

16 or 29.1 per cent.

N. Kekischeff.—"Ueber die End resultate der Brustkrebsoperation." (Thesis, 8 Berne, 1906).

In Kocher's clinic 103 cases of mammary carcinoma were observed during the last ten years, of which only ninety-five were operated upon. The radical operation was performed seventy-one times. Only sixty-seven cases could be heard from.

Year	Number of operated	Number of answers recorded	No. cases without recurrence	Per cent. of No. of operative cases	Per cent. of answers recorded
1895	11	5	3	27.2	60.0
1896	9	2	1	11.1	50.0
1897	10	6	2	20.0	33.0
1898	6	4	3	50.0	75.0
1899	10	7	2	20.0	28.5
1900	9	3	1	11.1	33.3
1901	9	4	2	22.2	50.0
1902	13	11	2	14.6	18.2

Average per cent. permanent cures, 32.8.

W. S. Halsted.—"The results of radical operations for the cure of cancer of the breast." *Transactions Am. Surgical Association*, (1907).

Group 1.—Complete sub-clavicular and neck operations. Total number of cases 210, cured 89.

Group 2.—First op., complete pectorlais or subcalvicular. Second op., supra-clavicicular or neck parts.

Axilla involved..... 124 cases
Axilla and neck involved..... 44 cases
Total..... 168

Actual cures	Axilla involved	Axilla and neck involved
	17	3 or 20
Cured 3 yrs. and over.....	22	5 " 27
Cases, not cured.....	45	34 " 79

Group 3.—Only complete pectoral operation. 232 cases.

Cases actually cured..... 75
Cured three years after operation with later metastases 14
Cases cured not less than three years..... 89
Cases not cured..... 121
Cases cured three years and more..... 89
Total number of cases..... 232

OPERATIVE TREATMENT OF MAMMARY CARCINOMA.

BY

C. E. RUTH, M. D.,

Des Moines, Iowa.

(With Sixteen Illustrations.)

FEW surgeons have had much fear in recent years of local recurrences following excisions of the mamma for carcinoma since due care is taken regarding adequate skin and fascial removals. Complete removal of all axillary lymph nodes and all lymph bearing tissues again reduced the fear of secondary recurrences by a very large percentage.

The use of the *x*-ray, post-operative, as an additional safeguard against recurrences has proven disappointing to many surgeons who have under its influence noted rapid dissemination of carcinoma.

With improved operative technic including early and complete mammary and axillary excision of all tissue which might possibly lodge carcinomatous infection, the benefits from the greatly lessened recurrences were offset largely by the fact that 31 per cent. of cases operated upon (see statistics by Dr. Greenoough) for carcinoma of the mamma had edema and swelling of the arm and many to the degree of incapacity. In my own experience, and this is corroborated by numerous other workmen, pain of a gradually increasing severity accompanied the edema and incapacity or was independent of one or both. The pain when present gradually increased in intensity and became agonizing and unbearable.

Some of my cases I am sure would have been very thankful for a return of the carcinoma to end their misery. The cause was not far to seek, many surgeons were loathe to remove the pectoral muscles which were rarely involved, besides the removal of the pectorals was believed to seriously impair the power and usefulness of the arm.

The result was that most operators after removal of all the glands and adipose in the axillary space as well as the mamma left the axillary vessels and nerves entirely denuded for their entire length in this space. The dead space thus formed could not be collapsed and as a result a cicatricial granulating tissue material grew in the axilla surrounding these important structures and as time elapsed

gradual contraction made their bite a thing to be dreaded by me equal to, if not more, than the original trouble.

It is impossible to collapse the axillary space with the pectoral muscles intact and this inability to close the space favors suppuration and increases the amount and final density of the cicatricial tissue filling the space. Bringing the arm against the side only reduces the amount of cicatricial tissue, but does not prevent its grasping the vessels and nerves, while it insures the serious limitation

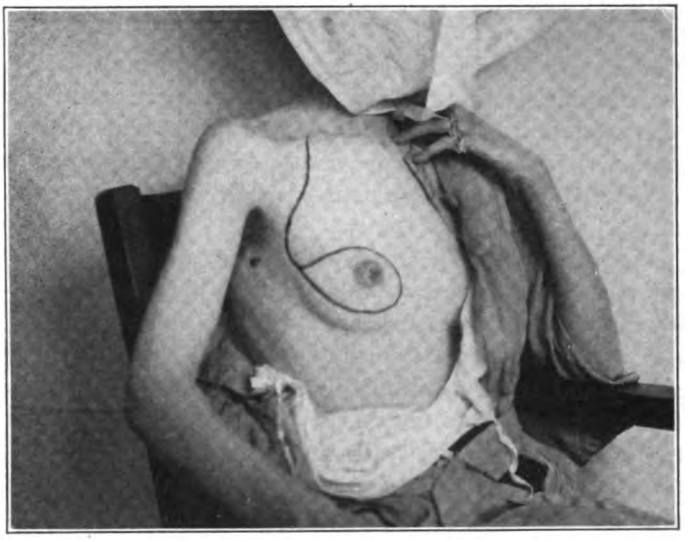

FIG. 1.—Represents the general or usual incision of the integument. The spot directly below the axilla indicates the point where the stab drain passes through the posterior flap. This drain is left in place usually two to four days. It often becomes necessary to modify this incision on account of the variation in location and extent of the malignant deposit.

of the arm movements by binding the arm to the thorax and at the same time nullifying the benefits of the pectoral retention.

Removal of the pectorals made it possible to force the integument down into the axilla and thus more easily close the space, but skin, thoracic wall and axillary vessels all bound together by cicatricial granulation tissue were found to be quite as serious in their obstructive and compression bite as to follow the plan of leaving the muscles intact.

In 1902 a pupil of mine, Dr. I. S. Buzard, operated for mammary carcinoma and again the next year did a secondary operation for recurrence on the same patient. In 1904 I was called by Dr. B. to

relieve the patient, if possible, from the terrible pain incident to compression of the axillary nerve cords by the cicatrix which closed the old dead space resulting from the axillary enucleation which he had done according to my teaching. There was no recurrence of the carcinoma and the patient was well, save from the cicatricial limitation of movement and the unbearable compression pain. Suffice it to say we lost the patient from hemorrhage and exhaustion follow-

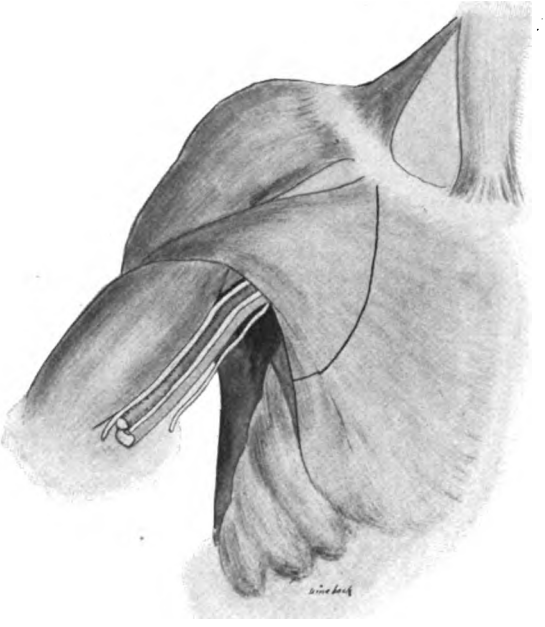

FIG. 2.—Indicates the line of section of the pectoralis major. The finger is passed under the muscle and the muscle is cut by the scissors. The pectoralis minor is sectioned in the same way but a little farther out.

ing a prolonged dissection trying to free these structures from the vise-like cicatricial bite.

Since then in every case of excision of the mamma and axillary enucleation I have divided the pectorals from the clavicle to the lower border of the axillary space and the outer part of the muscles are then retracted outward and the inner portion retracted inward, thus at once freely exposing the entire axillary space which is rapidly and easily cleared from above downward under easy sight at every step. The glands and adipose tissues of the axilla are

surrounded by gauze as the enucleation proceeds and they are finally removed with the mamma going wide of all probable deposit.

The inner or thoracic portion of the pectorals I usually remove as they can serve no useful purpose and may represent a danger, though small.

The distal part of the pectorals which were retracted outward are now brought back and carefully sutured to the thoracic wall above and to the latissimus dorsi and teres major below directly in contact

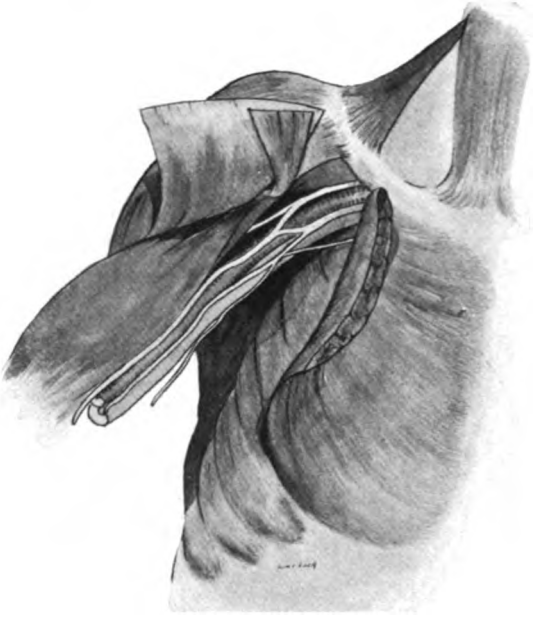

FIG. 3.—Represents the axilla exposed and all glandular and all gland bearing tissue removed with the distal part of the pectorals turned outward and the inner portion ready for removal as serving no longer any useful purpose.

with the axillary vessels and nerves so as to entirely obliterate all dead space and reduce to an infinitesimal amount the cicatricial tissue which will or can form between the elastic pectoral perimysium and the vessels.

The advantages of this procedure are not alone the complete obliteration of the dead axillary space but the reduction of the danger of sepsis by prolonged drainage from a non-collapsable space and the preservation of quite or almost perfect power and range of movement.

The outer part of the pectorals is quite as strong as the entire

muscle but allows at first a slightly lessened range, though later the patients usually complain of no limitations of movement. Some of my patients deny absolutely any diminution of either range or power of the arm.

Again, the distal part of the pectorals used in this procedure have never been known to be secondarily involved in carcinoma and so may be used without a particle of hesitation to cover the axillary

FIG. 4.—The inner part of the pectorals removed and the distal part of the pectorals sutured in position in contact with the axillary vessels so as to obliterate the axillary space entirely and prevent the formation of cicatricial compression tissue.

vessels, obliterate the axillary dead space and eliminate the compression curse of edema, impaired or destroyed function and torturing pain of 31 per cent. of these unfortunate cases.

Two years after I begun the use of the above method Dr. J. B. Murphy, I learned, was using a strip from the lower border of the pectoralis major for the purpose of covering the axillary vessels and nerves after enucleation to overcome the cicatricial contraction. Later he at times used the latissimus dorsi in the same way for the same purpose.

I have not been able to learn the exact date when Dr. Murphy began his work, but in 1906 he published an article on the subject and illustrated his operative method.

I began the method, which I have not found it necessary or wise to vary, in the early part of 1905. Impelled by the same necessities,

FIG. 5.—Mrs. S. (aged 45) Operation done eight days before but sutures not removed until the next day. The drainage opening always made in the posterior flap shows directly below the axilla. Union was immediate throughout without a particle of pus formation. The tubal drain was left in position three days.

The extensive undermining needed to secure coaptation and very wide tegumentary excision caused a peculiar outline to the wound though the incision originally followed very closely the outlines indicated in Fig. 1.

Now the 12th day after operation she can put her hand unassisted on top of her head.

Dr. Murphy and myself, without any knowledge of the other's work, were using muscular tissue to cover in the axillary vessels, to fill up the dead axillary space and prevent cicatricial edema, limitation of motion and pain. The plan I have used, practically without variation, preserves the entire muscular strength of the pectorals only shortened and perfectly closes in and obliterates the space. The blood and nerve supply to the distal part of the pectorals is retained without serious impairment. Some of my cases have been able in eighteen days to put the hand well above the head and none after

a few months have any marked limitations of range in movement. I have not promised any of my patients that the power and use of the arm would be perfect but some of them declare positively that the use of the arm is perfect in power and range in all positions.

Mrs. M., operated upon five years ago, writes, "I have just as good use of it as the other arm notwithstanding you told me I never

FIG. 6.—Mrs. S., five weeks after operation showing range of movement. The arms were extended and maintained without pain or discomfort. Convalescence was uninterrupted.

would. I can rub on the washboard, carry coal and water and use it just the same as the other one and there is never any soreness, pain or stiffness of any kind."

Miss S. Patient operated upon four and one-half years ago writes, "The arm goes up as straight as it did when I was in gymnasium practice. The effects that I notice are that in reaching for things at a distance it will not stretch quite as far as formerly, the elasticity seems less, besides I cannot hold out a weight for more than a moment. I presume that with a little regular practice that could be easily overcome."

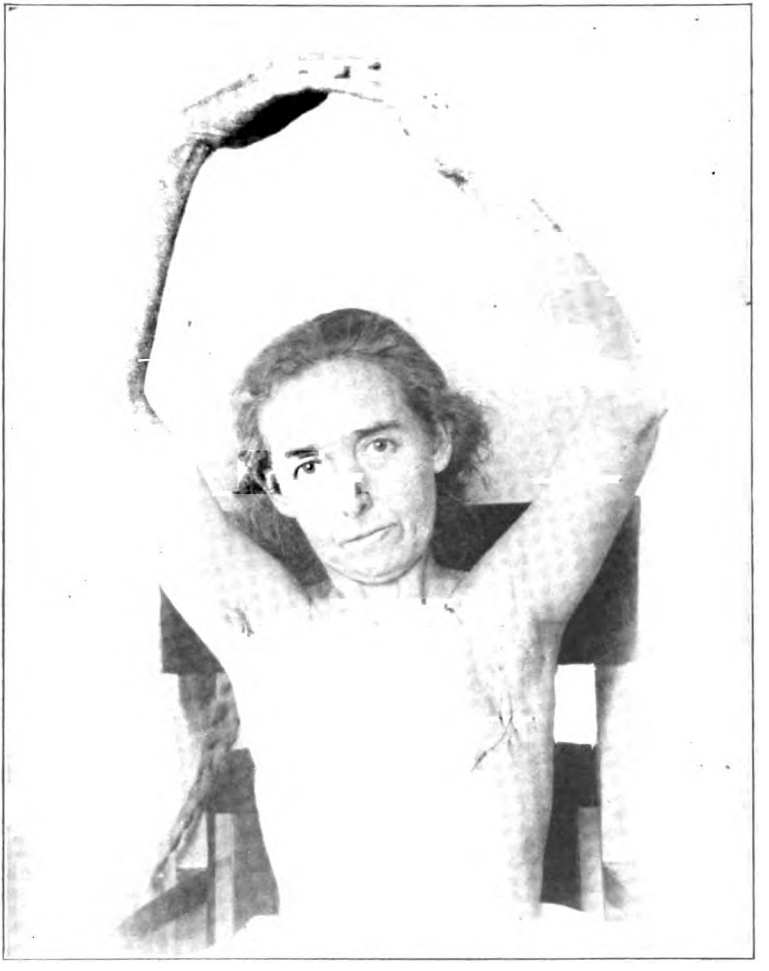

FIG. 7.—Photo of Mrs. C., 18 days following excision of left mamma, all axillary lymph nodes, and inner portion of the pectoral muscles. The distal portions of the latter were sutured to the chest wall and lower border of the lattissimus dorsi, both muscles being placed in contact with the axillary vessels and nerves. In this manner the entire axillary space is obliterated.

Patient was able to place arm in position shown in photo without aid or discomfort, but the hands were clasped so as to minimize the liability of movement during exposure of the plate as the photo was taken under adverse circumstances. Figures 8 to 13 inclusive were taken six months later.

Extract from Mrs. C's letter: "I can button any article of clothing down the back that is not too tight. I can clasp my hands behind my head and lie down on them so. I can put my arms akimbo. I can stand flat against the wall and lay my arms straight up the wall. In fact, if you were to require any kind of test, with the exception of lifting, I think I could easily do it. I have refrained from lifting anything beyond the weight of an ordinary book. I

FIG. 8.

FIG. 9.

can play on the piano some little time without much fatigue. Can sweep a little. Less than two weeks ago I swept four rooms and a hall, the longest task I have attempted since I came home six months ago."

I have used this method exclusively for eight years and in no case has a patient suffered edema, pronounced impairment of function of the arm or suffered pain from compression. The method therefore appears, without adding a complication of any kind, to entirely overcome the dangers and disadvantages of axillary enucleation.

The advantages of my plan would appear to be utilization of the least dangerous part of the pectorals while there is little or no loss of range or power, and at the same time the object of protecting the axillary vessels from cicatricial compression is perfectly accomplished.

FIG. 10.

FIG. 11.

FIG. 12.

FIG. 13.

FIG. 14.

FIG. 15.

FIG. 16.

FIGS. 14, 15 and 16.—Mrs. M. five years after operation showing appearance of operation site and range of movement.

DISCUSSION ON THE PAPERS OF DRS. ROSENTHAL AND RUTH.

DR. FRANK D. GRAY, Jersey City, N. J.—I notice that these photographs explain nearly all the movements that are naturally made by the arm, except the movements which bring into play the pectoral muscles. If I remember rightly, there was no photogrpaph showing they were not impaired.

DR. RUTH.—The photographs were taken with the exception of one, eighteen days after operation.

DR. ROBERT T. MORRIS, New York City.—I would like to ask the essayist if he employs this method when there is rather advanced carcinoma involving the pectoral muscle.

I was at work in Hamburg with Heidenhain thirty years ago when he first made a demonstration of epithelial nests in the pectoral muscles. I was deeply impressed with the insidious involvement of the cellular tissue planes of the pectoral muscles. If in some cases there is far advanced involvement of the breast with carcinoma, I would feel that some of the nests remained in distant parts of the muscle.

DR. LOUIS FRANK, Louisville.—Having in our experience found that the pectoral muscles were at times involved, we have made it a practice in our operations for carcinoma of the breast to remove the pectoral muscles *in toto*, both the major and minor. Possibly the women in our section of the country are different from those in other parts of the country, but impairment of function has not been noted to such extent that we would deem it necessary to retain a portion of the pectoral muscles to prevent any functional deficiency that may otherwise have been present.

With reference to these pictures: it has not been my experience to find the serratus located in such a manner as to make suturing possible such as shown on the plates. The edema we have seen, except in a few instances, has not been due to obstruction of vessels, as much as it has been due to the removal of the lymphatics. It is a lymphedema and not a venous stasis we have to deal with. It seems to me, we cannot by any method of dissection or muscle implantation, get rid of cicatricial tissue. There are no vacuums in nature in the human body, and where we dissect tissue or make incisions, the cicatrix always becomes attached to underlying structures. Wherever cicatrices form they are histologic fibrous tissue and this is true of all healthy processes. So the object of this particular operation is defeated if we bear in mind the histological processes in the healing of wounds.

In regard to the paper of Dr. Rosenthal: if we have the striking similarity, and if we have the exact analogy, as the doctor says, between cancer of the breast and cancer of the uterus, it is useless to discuss vaginal operations for the removal of carcinomatous uteri. It is an absolute impossibility to tell by vaginal operation how extensive the glandular involvement may be in carcinoma of the cervix. In speaking of carcinoma of the cervix, no matter how small or how short the duration, and how small the extent of the

cancerous involvement of the cervix, it has been my practice, in order to benefit my patients, to open every abdomen in which we have to deal with carcinoma of the uterus for the purpose of satisfying myself and the individual that there is no intraabdominal glandular involvement. The most promising cases have proved inoperable after the abdomen is opened. In the cases we think a radical operation justifiable and after opening the abdomen consider the condition favorable, we are doing the Wertheim operation.

In cancer of the body of the uterus we have an entirely different proposition to deal with, and these are to my mind the most favorable cases, the body of the uterus being one of the most favorable locations for carcinoma considered from the standpoint of cure. In my own experience I have never seen a recurrence where the uterus has been totally removed. The glandular involvement is usually not very extensive. In discussing the operation of cancer of the breast, I wish to refer to the matter of gauze dissection of the enlarged glands and of the axilla. If we are to get the best results in our operations for carcinoma, there must be an anatomical dissection with forceps and with the knife, or with a scissors, preferably the knife. The very thing Dr. Rosenthal speaks of, the dissemination of carcinomatous cells, takes place by gauze dissection. It is absolutely impossible to remove some of the cancerous areas we have in carcinoma of the breast by means of gauze. We know that. You have got to use the knife in dissecting glands off the axillary veins; you cannot get the carcinomatous areas off by gauze dissection. Further this gauze dissection squeezes out the cancer juices and brings about the very condition he is decrying.

As to the harmlessness of excision for diagnosis: if excision is done a week or two or three before the radical operation there may be danger of dissemination, but in suspected cases, where the microscope is necessary (and microscopic examination should be carried out in all cases for the purpose of confirmation even after removal), for a preoperative diagnosis, this diagnosis should be made while the patient is under the anesthetic, the operation proceeded with or abandoned, and not a lapse of ten days or two weeks permitted to intervene.

Dr. Hugo O. Pantzer, Indianapolis, Indiana.—It is with some hesitation that I mention my practice in cancer of the mamma. For several years before Halsted reported his method of operating in cancer of the mamma, I operated according to the teachings of Volkmann. Volkmann was the first to find and emphasize the fact that cancer of the breast early involved the fascia of the pectoralis major muscle, and that the disease only rarely transcended this structure and involved the muscle proper. At that time I stripped the entire pectoralis major muscle of its fascia, and included a thin parallel layer of the adjacent pectoralis musculature. Under the sway of Halsted's report, I was led to follow his course in operating, and removed the entire pectoralis major and minor muscles. The gratifying results obtained by the former less mutilating method, as found by repeated reports from old cases, have more

recently led me back to this method. At present I do again a large per cent. of my breast cases, at the early stage of the disease, without removing the entire pectoralis major and minor muscles. It is needless to say that the most painstaking removal of the fatty, *i.e.*, lymph-bearing tissues in the axillary, subclavicular and interpectoralis regions, is done invariably in all cases. Nothing short of full statistics—more than one man's practice can give—shall determine ultimately what structures it is necessary to remove, and what structures may be retained. For my part, it seems justifiable at present to perform the less radical procedure in many cases. In regard to the displacement of the pectoral muscle as advised by Dr. Reed, I feel there is good reason to consider it. The edema and pain following operation in some of these cases cause such distress as to make their avoidance most insistently to be wished for. I think we may be more sparing of the skin and subcutaneous tissue in some of our cases, and thus avoid part of this trouble by covering the wound more generously. I have been impressed with the fact that there are relatively few cases that come back for secondary skin recurrences, and that these few are operated with success in the large majority. Nor should we expect differently from *a priori* reasoning. The lymph channels running through the subcutaneous tissue, owing to the extensive removal of the gland-bearing tissues, have their communication cut off, and what cancer cells are retained, are commonly speaking confined to a local growth. It certainly is striking that so few cases show skin recidives, and that the greatest percentage of those having skin recidive is permanently cured by early local excision.

With regard to the case reported by Dr. Rosenthal, wherein he curetted and the microscopist failed to find malignant disease in the scrapings, and yet the future course of the case revealed cancer, it is well to bear in mind the difficulty of determining the true nature of the disease by microscopical examination. Nowhere is human effort perfect. But here the responsibility rests with the pathologist. However, what Dr. Rosenthal should have done in his case, was to scrape again the uterus and submit anew the tissues to the pathologist. It is probable then the positive evidence of cancer would have been found in time, when operation was yet justifiable.

Dr. Gordon K. Dickinson, Jersey City.—Experience teaches and in Dullas' Surgery, published in 1818, in connection with amputations of the breast it is advised first, to get around, lift it up without separating it from the axilla, dissect upward and clean out the axilla. His work did not receive much attention until Moore, an Englishman, first enunciated in an article that the proper operation for amputation of the breast was to include the pectoral muscles, etc. Now, we all have to go back to our knowledge of disease process before we can continue with any method of operating, and Heidenhain and Handley have made elaborate examinations into the spreading cancer cells in the lymphatic structures. You remember, you do not have any spreading of the disease according to the lessons in the physiological laboratory when you throw in

colored fluid; cancer cells follow the larger lymphatic channels. In Porier and Sappy's anatomy you see how they come upon the fascia and proceed in all directions. We know the general flow is from the muscle to the fascia and from the breast to the fascia; at the same time, if the channels get plugged up the extension is retrograde. I have seen recurrences in the pectoral muscle close up to the humeral bone. Because of the experience of edema, because of the researches of Heidenhain and Handley, and because of another reason I remove all muscle. I do not think the pectoral muscle has much to do with the motion. I think it is the deltoid. We have in New York one resourceful man, Dawbarn, who is constantly picking up tricks. Some years ago he suggested the idea of transplanting portions of the deltoid. He accomplishes what Dr. Ruth accomplishes. He covers over the muscle and blood-vessels and gives a larger working deltoid, according to his report.

With reference to the paper of Dr. Rosenthal, anyone who has been in Vienna and watched Schauta and Wertheim has come to a knowledge of the fact that Schauta does not know where Wertheim lives, and Wertheim does not know where Schauta lives. They are both working along different lines and both men are behind the gun. They hide themselves. You have got to have Wertheim and Schauta die before statistics work out. (Laughter.)

Hugh Young has done a lot of prostatectomies through the perineum. We men cannot do the work he does. Time will work that out. So it is with the Schauta operation. You can see him go into the vagina, fixing up and go about the ureters, and get the parametrium, as well as Wertheim ever did, and he does it with as little hemorrhage as Wertheim. The Wertheim operation is very good, but it is apt to be bloody. I think the Schauta operation has got a future. I think practically you can take away as much of the tumor by the low operation as by the high.

DR. RALPH WALDO, New York City.—Just a word with reference to Dr. Ruth's paper. The first time I cut away the pectoral muscles, I expected the patient to be crippled so far as motion of the arm was concerned. I was surprised to find that she was not. I had, in a few cases following that method, decided restriction from cicatricial tissue. At present, I remove the pectoral muscles, also the fascia, which is most important, and any glands I can find, and then in the subsequent dressings have the arm entirely free. My patient never has the arm restricted more than twenty-four hours and seldom that length of time. They are usually out of bed in twenty-four to forty-eight hours. I wish I could show you a patient I saw last Sunday, on whom this complete operation was done five months ago, removing both pectoral muscles and the fascia. The patient, whose case is typical of others, told me that she has as good motion of the arm as she ever had, and I believe it is very largely due to the fact that the arm was never restricted.

Regarding the propriety of leaving these tissues, I would challenge that, because, it seems to me, it is a step backward, considering the clinical results of many good operators, also the microscopic

findings of cancerous tissue in and about the fascia and in the substance of the pectoral muscles.

DR. J. H. CARSTENS, Detroit.—I feel a good deal like the gentleman who has just spoken. I think very much depends upon how we manage these cases afterward. I have always insisted that the fascia was more dangerous than the lymphatics, and I thoroughly remove the fascia and the muscle. Sometimes I leave a little strip of the muscle. I take off the glands, but I start in the axilla and work downward, because I think we have less danger of absorption or reinfection if we cut down, and I cut very quickly, so that there is no danger of reimplantation. I take the breast out in about two minutes. I remove the glands and such other things as I think necessary. I allow my patients to use the arm from the beginning. First, I put in a rubber drainage tube in the axilla, let it drain for three or four days, and then take it out, and it is all dry. As soon as healing has taken place, I instruct the patient to move the arm and massage it, and it is wonderful how you can put skin on the bare ribs and everything will be soft and movable in a short time, just by thorough massage and making the patient use the arm from the first day. That is very important. It has more to do with the movement of the arm than anything I know of. I cut away as much as possible and my patients do not complain about restriction of the movements of the arm. It is true, they may have some trouble in executing certain movements with the arm at first, but the freedom of movement is great in a short time.

Regarding the removal of the uterus, I feel pessimistic about it. I do what Schauta does and what Wertheim does, and what they all do, and we in the present state of our knowledge cannot tell whether or not we remove all of the cancerous tissue. I think Schauta has proved by his investigations and numerous sections of the glands in the pelvis, that they may be all free from cancerous tissue, although the uterus was badly diseased, yet there were little lymphatics way up under the diaphragm which contained cancerous cells. These run through the little lymphatics in the pelvis, and some of the cells may extend up to the liver. You can take out all the glands in the pelvis and the uterus, together with the parametrium, and yet there may be a couple of glands you never find. These may be near the liver or the stomach or somewhere else, and are going to break out afterward, and we are never sure in the present state of our knowledge that all the cancerous tissue has been removed.

We must try to operate early on these cases. I have removed with the curet scrapings from the uterus, examined them and have said they were cancerous. I have taken out the uterus, examined it, and no cancer was discernible. Now and then we may remove a uterus for benign disease. If the pathologist makes a mistake I cannot help it. Perhaps there may have been a little bit of cancerous tissue removed by the curet, and the woman might have recovered without any vaginal hysterectomy. But the point I want to make is this: in the present state of our knowledge we cannot tell

whether all of the disease has been removed or not. We do not do much harm if we remove enough tissue, and then we are on the safe side. It is better to remove a little more than not enough.

DR. WILLIAM EDGAR DARNALL, Atlantic City.—A good deal has been said about the limitation of mobility of the arm, but there is one point that has not been mentioned. I think a good deal depends upon the location of the incision. Those cases on which I have operated, who have had difficulty in the motion of the arm, have had the axillary portion of the incision made too high. If the the incision runs up at all on the arm it will limit motion, but if the incision runs right down into the axilla there is no difficulty in mobility, although I have removed all of the muscle or the greater part of it. I think the location of the incision in the axilla has a great deal to do with the question of mobility.

DR. RUTH (closing the discussion on his part).—In all my work in the last eight years I have utilized this method in cases of advanced carcinoma. I used it in one case in which ulceration was extensive, and there was no sign of recurrence after three years.

In regard to the edema noted in the photograph, I disposed of that in my statement. If we had time, we might throw some of the slides on the screen again, but it is unnecessary to do so. I made the measurements of one case myself, and the other photographs were taken at a distance, and reports made in regard to the capacity of the arms. There is no difference.

In regard to the matter of cicatricial formation and contraction, there is no question but what there must be some cicatricial repair in every case, and even if you spare the distal part of the pectoralis, remove the fascia that may be involved on either side, as well as cleaning out the axilla, it stands to reason, if you can bring the muscular tissue in contact with the vessels, you will have a minimum amount of cicatricial tissue formed. This is a decided advantage or gain over a cicatricial mass which is great in extent and has no elastic base behind it, as is constituted by the muscular tissue itself.

The most careful operative manipulation of the mammary gland may dislodge carcinomatous elements and discharge them into the axilla be the manipulation ever so gently made. But if you start above, you can control the situation at once, cleaning out the axilla from above downward, and not making gauze dissection, but being careful to remove every particle of this tissue. You have started by dissecting from the clavicle downward, enveloping all excised tissue with gauze to prevent contact infective implantation into territory that has not been already involved. I have seen cases in which that has occurred in the abdominal wound when operations have been done for malignant trouble on the adnexa, producing implantation of typical carcinomatous material in adipose tissue where we could not expect it to occur primarily.

I am basing my statements on the report of Greenough which takes in all of New England, and he reports that 31 per cent. of these cases present edema, impairment of function, pain, or all com-

bined and the pain in these cases is unbearable. It is to avoid this, that I use this method.

As to the secondary involvement of the pectoral muscles themselves, Murphy has only known it to occur in one case, and none other has been reported to my knowledge but the one just mentioned by Dr. Dickinson, and I question if that would have occurred had the fascia been removed.

In regard to placing fat in the axilla, I would not want to use it because its vitality is too low and it lends itself too readily to the spread of infection. You cannot close the axilla entirely; you have to provide some drainage, and as fat represents a minimum amount of vitality and a maximum of liability for infection, I prefer to use material that possesses greater power, with no material impairment of its blood and nerve supply.

DR. ROSENTHAL (closing the discussion).—My trouble has not been with loss of motion after these extensive operations on the breast. As a rule, these people have good use of the arm. I do not bandage the arm. My trouble has been edema. I have been under the impression that the extensive removal of lymph structures has much to do with this edema. Since it has been found that a plastic of the muscle over the vessels seems to reduce the danger of the edema, I have been using it.

By the way, I was a little embarrassed in bringing my statistics, a total of sixty-two cases, before you. If we consider all cases not heard from and all cases operated within the last year, as dead, there would still be only twenty-five cases dead out of sixty-two. Even this would be an unusual result. I tried to make a reasonable apology in the body of my paper for laying before you such unusual statistics. Out of twenty cases operated on up to 1908, sixteen are living. Of those dead in the total list some lived more than five years.

With reference to gauze dissection, one should be careful. The glands have a decided capsule; do not break it or cut into it.

Coming to the relative value of the abdominal and vaginal operations and replying to Dr. Frank, I was of the same opinion in reference to the abdominal radical operation seven years ago when I published a paper on the subject, reporting some few cases, but it has been proven to the satisfaction even of Wertheim, that the removal of the glandular involvement in the pelvis is not material. Where the glands are involved in cancer, those cases are hopeless, and where the glands are inflammatory, they will take care of themselves. Abdominal radical hysterectomy is a dangerous procedure, one which carries with it a high mortality.

Hemorrhage has never disturbed me in this operation. It is not a bloody operation in my experience. The advantage of the vaginal operation is that of lesser mortality. The ureters are the only organs that are to be feared, and forsooth in cancer of the uterus you will operate in a blind way and necessarily hug the malignant tissue which is infectious, producing metastasis later. Therefore, you will hug the tissues as closely as possible to avoid the ureters

and you are willing to operate in the dark and at the expense of completeness just because you are afraid of the ureters. Any operation that will lay bare the ureters, is just as good as any other operation that does the same thing. The parametria, not the pelvic glands are the analogue of the fascia and glands of the breast operation. It is in the parametrium we have recurrence, and in the ordinary hysterectomy, abdominal or vaginal, it is in the parametrium and vault of the vagina we have infiltration and recurrence, and the only advantage that accrues from the greater operation, the abdominal or vaginal, is laying bare the ureters. Operate in a clear field where you can do surgery, directing your efforts to the extirpation of the cancer and cancer-bearing area unhampered by the fear of wounding or ligating a ureter.

LACERATION OF THE CERVIX, A CAUSATIVE FACTOR IN SALPINGITIS.

BY
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THERE is a type of salpingitis whose presence is not infrequently disclosed during an abdominal section performed for some pelvic lesion other than a tubal trouble.

The finding under such conditions of an unsuspected tubal pathology prompted me to a closer clinical scrutiny of any pelvic disease before operation in the hope that the operative and the clinical diagnosis might not be too much at variance.

The operation disclosing the existing salpingitis was usually undertaken either for an appendix lesion, a cystic condition of the ovary, a retrodisplacement of the uterus, or for a multiplicity of these pathological conditions. The disease of any of these organs usually presented clinical manifestations that gave little or no difficulty in arriving at a preoperative diagnosis. All seemed satisfactory from a clinical standpoint, excepting the failure to recognize the existing salpingitis. Here was a condition apparently severe enough to invite symptoms sufficiently pronounced to court a diagnosis, and yet this condition was overlooked. Upon what grounds can this oversight be explained?

It must be explained upon one basis, *i.e.*, that the other existing morbid conditions of the pelvic organs presented symptoms sufficiently severe to overshadow the symptoms of the salpingitis that was present. This gave an interesting aspect to this type of salpingitis, suggestive of the fact that the tubal trouble must be the result of a mild infection; that it must be of a chronic nature and possess a symptom-picture that has lost much of its intensity and characteristics. Furthermore, this type of salpingitis was not a serious menace to the health of the woman.

The pathological aspect of the tube as it presents itself during operation bears out this assumption. That the infection was of low type is evidenced by the inflammatory nature of the tube and the immediate structures. The tissues appear of a dull reddish hue and are edematous, presenting a distinctly inflammatory infiltration.

The tubal structure proper is swollen, often showing irregular sacculations. Invariably the condition is bilateral, with the tubes quite free and often prolapsed. It is not unusual to find the ostium of the tube closed, transforming this type of simple salpingitis into a hydrosalpinx.

That the salpingitis is subacute and chronic in character can be convincingly inferred from the vagueness of its clinical manifestation. Usually nothing more than a "tired pain" in the back and a dull aching in the hips is the principal complaint of the patient. This pain is so constant that it has become a part of the woman's nature. Inasmuch as its degree of severity fluctuates but little, the pain is permitted to go on, the woman saying little and bearing her burden as only a woman can.

The disclosure of a vaginal examination does not prove definitely the existence of a salpingitis, because the examining finger cannot interpret correctly the pain that seems to pervade a hypersensitive pelvic viscera. The existence of a hydrosalpinx, when sufficiently large, can usually be diagnosticated by palpation without difficulty, whereas a tube that is slightly or not at all distended with fluid will present its difficulties.

The rather frequent finding of this tubal pathology during an abdominal section presented certain phases of interest. One phase is that of its etiological nature. Here an important factor for consideration was that the condition invariably manifested itself in a woman who had borne children. At no time has this type of salpingitis been observed by me while operating on a woman who had not borne children.

It must be assumed that a vagina which has been subjected to the abuses of childbirth possesses no longer the full protecting media it had before labor.

Microorganisms, such as the streptococcus, staphylococcus, and the bacterium coli commune, which are constantly found about the vulva, and which have difficulty in developing or surviving in a normal vagina, will no longer find, in a vagina whose physiological barriers have been weakened through parturition, that the inhibitory influences of the Dōderlein bacillus are so extremely detrimental to their existence.

In a woman who has given birth to children the most frequent lesion that can be directly attributed to childbirth is a laceration of the cervix. It is a trauma whose importance has been not only too often disregarded but it has also been underestimated. True, if the tear is a superficial one, it will most likely heal completely in a short

time. If, however, the laceration is a deep and perhaps an extensive one, it will not heal. Eversion of the traumatized lips of the cervix will take place, and a chronic inflammatory process with its sequelæ will become established.

When the inflammatory disintegration of the tissues of an ectopic cervix, with its lowered resisting tone, is considered, it can readily be comprehended how such a diseased cervix can through its rich lymphatic supply, invite an acute microbic inflammation whose tendency to chronicity may be a question of a very short time. A great deal depends upon the capacity of the tissues for resisting a microbic invasion, and this is happily influenced by the physiological congestion, both menstrual and sexual.

Inasmuch as the portals of a lacerated cervix through which the microorganisms can gain entry into the channels of transmission are constantly open, an infective process may continue as long as microorganisms are present in the vaginal secretion, and are being carried to the structures where the lymphatics go.

That lacerations of the cervix are the most common atria for infection of the tubes is evidenced by the frequency with which this pathology is encountered during operation. Not only is the infective material carried by the cervical lymphatics to the tubal structures, but it is also deposited into the cellular tissues of the broad ligament.

Another phase of interest presented by these cases was to note the influence of the infective material upon the tubal structures. It was found that in more than one-half the cases the ostium was totally occluded, presenting a typical hydrosalpinx.

The dilatation of the Fallopian tube was only moderate, comparing in size to the diameter of a lead pencil. The rest of the cases presented a tubal pathology that had the appearance of an uncomplicated salpingitis of a subacute nature.

Sacculations of irregular shape were found in a number of cases, both in the hydrosalpinx and the simple salpingitis. Anent the hydrosalpinx, the logical deduction must be made that the tubal infection was caused by microbes possessing a low degree of virulence, yet sufficiently toxic to set up a perimetritis on reaching the peritoneal cavity, thus bringing about a perimetric closure of the ostium. In the cases of simple salpingitis this degree of virulency evidently did not exist. The fact, however, must not be overlooked that a simple salpingitis might have been the sequel to a hydrosalpinx. This pathological evolution must be attributed to a lowered toxicity of the infective material and to the increased powers of restitution at some time during microbic activity.

This view is supported by the fact that when a lacerated cervix is subjected to plastic repair, some of the women who seemed sterile, after having given birth to a child, again became pregnant. It must be assumed that the plastic repair of the cervical tear inhibited the further absorption of toxic matter, thereby removing a morbid stimulus and permitting a partial recovery of the tube. It is not strange that nature should seek to open and keep open its avenues so essential to procreation. By observing these cases of sterility, where a plastic on the cervix seems to restore the woman to her normal powers of conception, the evidence becomes almost convincing that such a pathological condition, occlusion of the ostium, must have existed at the time of their sterility.

With much regret have I repeatedly witnessed, as a disinterested spectator, the removal of the tubes for a condition of hydrosalpinx that was accidently encountered during an operation, thus rendering the woman sterile. I have always felt that this is a pathological condition which should not be subjected to such drastic measures.

It is one of the few tubal infections where very frequently restoration will take place without sacrifice of these organs. The necessary surgical measure for relief consists in freeing the fimbriated end of the tube, turning back the mucosa and retaining it with a suture. Of equal importance, however, is the obliteration of the primary focus by plastic repair of the lacerated cervix. The source inviting microbic inflammation having been removed, infective material will no longer find routes of transmission to the tube. Freedom from these continued bacterial assaults will gradually permit the tube to return to a normal or an almost normal state, with the possibility that the patient may again become pregnant.

REPORT OF CASES.

BY

ARTHUR T. JONES, M. D.,

Providence, R. I.

I. Case of solid tumor of parovarium evidently originating from the Wolffian body.

II. Case of large sarcoma of ovary. Great amount of fluid in abdominal cavity. Improvement in general condition since operation. Prognosis good for several years in this type of case.

III. Results three years after hysterectomy in case of sarcoma and carcinoma of the uterus.

CASE I.—Mrs. X. White. Widow, forty-nine years old. Had one child twenty-three years ago. No other pregnancies. Menstruation regular, every twenty-eight days. Not painful. Duration four to five days. Amount moderate.

Present illness. One year ago fell upon floor in one of the department stores, following which she had prolapsus uteri for three months. Immediately following this she noticed her abdomen getting larger. For several months previously she had nausea and vomiting. Pressure upon the rectum and desire to defecate almost constantly, but was unable to accomplish the act, and at one time had impaction of the bowels. Complained of severe backache constantly, pain extending down both legs.

Examination shows the abdomen very much enlarged, a mass extending well above the umbilicus. Mass seems elastic and has the general feeling of a cystic growth. Bimanual examination shows a mass rather elastic to the examining fingers and filling the pelvic cavity. The cervix can be made out, but the mass covers the uterus so fully that it is impossible to palpate the uterus separately.

Tentative diagnosis: Probable large ovarian cyst.

Operation January 22, 1913. Upon opening the abdomen, a tumor the size of adult head was found, filling the pelvis and abdominal cavity, extending higher on the right side. The vessels over its surface were very much dilated. The tumor was found to be intraligamentary arising from the left side and intimately connected with the uterus. One loop of intestine was adherent to it for a distance of 8 or 9 inches. Peritoneum of broad ligament cut and tumor shelled out in part. Supravaginal hysterectomy was done, as it

was impossible to free the tumor from the uterus. Round ligament ends were sewed to the cervical stump, and peritoneum closed over this. Closure of abdominal wound in layers by the usual method.

Upon incising the tumor, which still had all the appearances of a cystic growth, it was found to be a solid tumor.

The pathological report is as follows:

January 22, 1913.

Specimen of uterus and appendages.—The specimen is a uterus with adnexa removed by supravaginal hysterectomy. The left broad ligament contains a large solid tumor mass which comprises the bulk of the specimen. This tumor is a solid, elastic mass measuring 25×18×9 cm. and weighs 3175 grams (7 pounds). The free surface is reddish-pink with deeply injected and dilated veins. On median longitudinal section the cut surface is generally smooth, pearly white in color, and shows numerous larger and smaller distinct fibrous whorls. One area of the cut surface is of finer meshwork-like structure and is markedly pink in color. Scattered throughout the tumor there are many larger and smaller islands of smooth, flat, fleshy tissue, of pale pink color. As the knife passes through the substance of the tumor there are encountered areas of increased resistance with a distinct "grating" feel, but there is nothing present to suggest true ossification. The left oviduct measures 21 cm. Left ovary 5×1.5 cm. Right oviduct 13 cm. Right ovary 5×2.8 cm. The uterus from fundus to point of amputation measures in the canal 6 cm. At the level of the cornua the breadth of the canal is 2.5 cm. The uterine wall averages 2 cm. in thickness and the endometrium 4 millimeters.

Microscopic Examination.—Sections cut from many different areas present a widely varying histological picture. The main bulk of the tumor appears to consist of relatively dense connective tissue in which there is considerable variation as to the number and size of the component cells. Associated with this tissue as a frame work there appears in various areas unstriped muscle, cartilage cells, and in some instances cells that are epithelial in type. All of these elements show little, if any, purposeful arrangement or distribution. In one section, however, there is a marked tendency to formation of a structure suggestive of a rudimentary kidney. Here appears the suggestion of primitive glomeruli associated with columns of cells that are epithelial in type. That these columns are an attempt at tubular formation is seen where they appear in cross-section when there is often a quite definite lumen surrounded by cells that are

distinctly epithelial in character. In this area also the blood-vessels are larger than elsewhere, present more definite form and a more perfect and regular endothelial lining.

Unstriped muscle is more or less widely distributed in nearly every section examined. The cartilage cells appear in larger and smaller groups and are less often observed. In some fields the connective tissue is loose and wavy and at times appears almost myxomatous.

This is a neoplasm that is very complex in structure. Different portions present areas in which the histological picture observed alone would permit an interpretation that would not be justifiable considering other areas and the tumor as a whole. Tumors of the broad ligament usually originate from the paroöphoron or parovarium, in either instance being resultant to awakened or continued activity in those portions of the Wolffian body that ordinarily atrophy or remain dormant. The tumor now in question is considered as resultant to such activity of embryonal tissue. The picture of primitive kidney suggests the possibility of still active cell elements of the pronephros which embryologically appears before the mesonephros, the Wolffian body, as being a possible origin of the neoplasm.

A neoplasm classified as hypernephroma occurs not infrequently in all parts of the urogenital tract, and one might pertinently ask if the neoplasm submitted could not be classified as such. The structure and component cells are *not* those of hypernephroma and the lesion does not concur with the hypernephromas that I have personally examined of adrenal, renal, testicle, ovary, and broad ligament origin. It is difficult to classify such a tumor as that now examined. It consists of a conglomeration of embryonal tissue and it would seem wise to classify it, for want of better terminology, a neoplasm of the broad ligament, embryonal in type.

(Signed) HAROLD G. PALMER.

CASE II.—Mrs. X. White. Married. Fifty years old. Had one child twenty-nine years ago and three miscarriages, the last one twenty-five years ago. Menstruation up to the time of menopause was always irregular, painful at times. Duration five days. Amount moderate.

About fifteen months ago was examined by a doctor, whom she consulted for a vaginal hemorrhage, she having had no menstruation previously for two years. It was discovered at this examination that there was a pelvic tumor present, evidently a fibroid, and no operation advised.

One year ago she had fistula *in ano*, which was operated upon,

and following operation, for some months she had feeling of pressure upon the rectum.

For the past three months she has suffered from pressure symptoms, sense of heaviness and falling down, soreness through abdomen, shortness of breath, and has noticed that the abdomen has been getting steadily larger. The patient is a large, well-developed woman, very well nourished and no apparent loss of weight.

Examination shows the abdomen prominent, mass felt in median line size of an orange. Mass seems freely movable. Another mass or portion of tumor can be felt extending upward on the left side. The outlines of the whole tumor are rather indefinite. Bimanually, the cervix is small and a large irregular fibroid feeling mass apparently connected with the uterus can be made out. Through the abdominal wall, the feeling is that of the presence of a cystic growth associated with fibroids.

Tentative Diagnosis.—Uterine fibroma with probable cystic growth.

Operation February 1, 1913. Celiotomy. Incision in the median line. Upon opening the abdomen, a large quantity of straw-colored free fluid was found, and a tumor the size of an infant's head, hard and fibrous in feeling, originating from the left ovary and adherent to left broad ligament. Pelvic portion of sigmoid seemed thickened but no definite mass in it. Epiploicæ of sigmoid much inflamed and enlarged. Right ovary size of a large English walnut and papillomatous looking as if becoming involved in malignant process.

Gall-bladder palpated and found normal, but at the foramen of Winslow was a glandular mass, size of a walnut. Both appendages with the tumor were removed. The uterus was considerably enlarged and contained a small fibroid growth, but was not removed.

The abdomen was closed in layers in the usual manner and patient made an uninterrupted recovery.

The diagnosis at time of operation was sarcoma of the left ovary with probable sarcoma of the right ovary, with evident metastases, and the prognosis given was unfavorable.

The pathological report is as follows:

February 1, 1913.

Specimen from ovaries.—The specimen for examination is a tumor of the left ovary. It is a solid tumor mass 9×11×13 cm. On mesial section the mass is solid throughout, generally smooth and homogeneous, and of pale yellow color. The right ovary measures 20×30 mm. and presents an evacuated cyst 12 mm. in diameter. Its walls are smooth and shining.

Microscopic Examination. Left Ovary.—Sections present a solid mass of proliferating cells that have small, deeply staining, vesicular nuclei and very scanty cytoplasm. These cells are intimately associated with wavy bands of fibrous connective tissue which vary much in density in different areas in the sections. The neoplasm is well supplied with capillary blood channels formed from cells of the neoplasm. There is no normal tissue.

Pathological Diagnosis. Fibrosarcoma. Right Ovary.—(Section cut to include cyst wall.) The ovarian stroma is increased in density, but not otherwise remarkable. The cyst wall, which is irregular in outline because of numerous finger-like inward projections of stroma, is lined with tall columnar epithelial cells that have large, central, well-staining nuclei and generous cytoplasm. These cells are usually present in a single layer but at times are reduplicated. The lesion is benign.

[Signed] HAROLD G. PALMER.

The patient's condition has steadily improved since operation, and at the present time she is apparently in perfect health. There is no evidence of free fluid in the abdomen. Color is good. Appetite excellent, and no shortness of breath.

CASE III.—I wish to report the results at this time on a case of carcinoma and sarcoma in the same uterus, which was presented at the twenty-third Annual Meeting of this Association held at Syracuse, 1910.

This case had a hysterectomy done May 18, 1910. Examination August 21, 1913, three years following her operation, shows the patient to be in excellent general health. Locally, there is no evidence of any recurrence of the malignant condition. This case had a complete hysterectomy, but not the extensive Wertheim operation, and although three years may be too short a time to feel secure of permanent cure, still it is interesting to know that three years following operation for such an extensive involvement, with two different types of cancer, the patient is apparently in perfect health.

THE USE OF IODINE IN ABDOMINAL SURGERY.

BY

LOUIS FRANK, M. D.,

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To the carbolic spray of Lister, in the present day of aseptic surgery, is indeed a far-cry considered from the standpoint of the development of surgical methods. Even in the author's experience of twenty-five years there have been many striking changes. Early in our surgical career everything in the healing of operative wounds, even the patient's life, depended (?) upon the liberal use of bichloride of mercury; and the writer distinctly recalls more occasions than one where this drug in solution of 1:5000 was used for irrigating the peritoneal cavity! Needless to say the mortality was very high. The use of bichloride of mercury, however, for the preparation of the field of operation is yet in vogue in many hospitals.

The general method of preparing the abdomen until within very recent times was to use a liberal amount of soap and water and a scrubbing brush, following this with ether, then alcohol, and a generous application of mercuric bichloride in solution. Until about a year ago our own method for the past ten years was, after a thorough shaving, to have the abdomen prepared by washing with soap and water followed by alcohol; the application of a soft-soap poultice which was left on from two to four hours; then again washing with water followed by alcohol, after which a sterile gauze dressing was applied and the patient sent to the operating-room for the final pre-operative step in cleansing. This consisted in again washing the field with soap and water, using gauze sponges, followed by a thorough cleansing with alcohol well rubbed in. After such preparation, even in emergency cases in which only that much preparation designated as "pre-operative" was used—such as intestinal obstruction, acute appendicitis, acute gall-bladder disease, Cesarean section, in fact any abdominal operation—there was always primary healing in clean cases. The greatest objections to the method were that the table frequently became sloppy, the patient's clothing became wet, and four or five minutes being required to complete the technic there was some delay in proceeding with the operative work. There are, of course, other objections which are self-evident.

In the last few years, since the work of Cannaday, a member of this association, and particularly since the classical paper of Grossich which appeared in 1908, surgeons generally in abdominal as well as other work have come gradually to the use of iodine in the preparation of the operative field. The value of iodine as an antiseptic is undoubted, as numerous experiments in the laboratory and its practical use have shown, and likewise its usefulness in surgery is unquestioned. In emergency surgery it is believed to be the best of all antiseptics, possessing a value which is inestimable. Its use has recently been advised intraperitoneally, and it is to this phase of the subject that we desire to particularly address our remarks.

My attention was first called to the intraperitoneal application of iodine by a paper by Prof. William O. Roberts, of Louisville, and in the discussion which followed I stated that I believed it was a dangerous drug. It seemed to me that practically the same condition confronted us as in the early days of antiseptic surgery in the use of bichloride of mercury, and notwithstanding the clinical reports of recoveries following its application, I could not believe it was harmless when employed within the abdomen. To determine this latter point, we have made some fifty experiments upon dogs, and others are being prosecuted. In the execution of this work there were a number of points to be determined.

(1) Is the tincture of iodine toxic when introduced into the peritoneal cavity?

(2) Is iodine itself toxic when applied to the peritoneal cavity?

(3) Does iodine or its tincture have a harmful effect upon the peritoneal endothelium?

(4) If the effect is harmful, how long must the contact with iodine continue to produce harmful effects?

(5) Is the effect of tincture of iodine and of iodine the same in the infected as in the normal peritoneum?

Further points to be determined are: (a) is alcohol detrimental to the peritoneum, and (b) is iodine in aqueous solution toxic or harmful in the same dosage as the alcoholic solution?

We have practically determined all these points except the effect of the tincture of iodine and iodine in the pathological abdomen; and, as these experiments are still in progress, we hope shortly to demonstrate this feature from a laboratory standpoint.

I will not burden you with reading the protocols of all our experiments as these will be published in the transactions, but will give a summary of our work and our conclusions after a careful study of the effect of tincture of iodine upon the peritoneum.

We have found that tincture of iodine injected into the peritoneal cavity in quantities greater than 0.125 per cent. of the weight of the animal invariably produced death; that death occurred either from shock or from the toxic effect of the iodine, and in the latter case the animal lived from two to three days. Pure alcohol used in like quantities did not produce death, though Lugol's solution acted the same as iodine in tincture, and in some instances more quickly. We conclude, then, that iodine is distinctly toxic when introduced in solution into the normal peritoneal cavity.

It will be remembered that the U. S. P. tincture of iodine contains about 7 per cent. of pure iodine. The doses given in these experiments amounted to about 0.0875 gm. per kilo of weight, which would correspond to the employment of 100 c.c. of the Tr. iodine in the average individual weighing 150 or 160 pounds. We mention the quantity because it is stated by those who are using iodine within the peritoneum that it may be poured into the cavity a pint at a time. Crisler and Johnson say they have sometimes used as much as a gallon of a 33 1/3 per cent. dilution of the officinal tincture with alcohol.

While Lugol's solution contains less iodine than the officinal tincture, it is apparently more toxic than the tincture or pure iodine. We think this is due to the greater saturation in Lugol's solution than in the tincture. Pure iodine in quantity equal to the amount present in the tincture and which was sufficient to destroy the life of the animals, did not produce death. Here, however, the iodine is not in soluble form, and we had only its local irritating effects. In quantities less than 1 c.c. per kilo of weight, death was not produced, and in these experiments we found only the local action of the iodine.

This drug is very irritating to the normal peritoneum producing destruction of the endothelium with an invariable and constant adhesive peritonitis. This was demonstrated by experiments on eleven dogs, the amount of the tincture used varying from 1/3 c.c. to 3/4 c.c. per kilo of weight. In large quantities, from 2 to 5 c.c. per kilo of weight, death ensued almost immediately from shock, and in every instance the tissues were dehydrated, presenting the appearance of having been exposed to intense heat; in other words, they seemed to be charred.

In the largest non-lethal quantities, that is 1.25 c.c. per kilo of weight, we found evidences of tremendous irritation, there being in every instance a great extravasation of serosanguineous fluid. The blood-vessels, mesentery, omentum and intestinal tract were markedly congested and distended with blood.

It is difficult to determine whether the adhesive peritonitis where small amounts of the tincture were used was due to the iodine or the alcohol which held it in solution or to both. In three dogs in which alcohol in quantities of 1.25 c.c. per kilo of weight were injected, there were well-formed adhesions at the end of two days with extravasation of serum. In all three the abdominal cavity was filled with serosanguineous fluid.

Pure iodine in quantity equal to the amount contained in 1.25 c.c. of the tincture did not produce death in experimental animals, though the result to the peritoneum was deleterious. In each instance where it was used there were found postmortem dense adhesions with some of the iodine unabsorbed and easily recognizable in the walled-off areas.

Lugol's solution in nontoxic quantities caused tremendous extravasation of serosanguineous fluid, staining the tissues yellow. There was also present after its use fine adhesions between the omentum and the intestines, the blood-vessels of the mesentery and the omentum and parietal peritoneum being markedly congested.

In another series of experiments, after preparation of the abdomen of the dog as is ordinarily done preceding operations upon human beings, the intestines were brought outside, left in contact with the prepared and painted areas of the abdomen for periods of three to five minutes protected from the air with saline saturated sterile gauze pads. They were then carefully returned to the abdomen and the incision sutured, all the work being done under the strictest aseptic precautions. As controls for these experiments, the abdomen was prepared the same as in the previous series and was opened in similar manner, but after making the skin incision and before opening the cavity the iodine was covered; in other words, gauze saturated with normal saline solution was placed about the incision in such manner as to absolutely preclude the possibility of the iodine coming in contact with any intraperitoneal structure The intestines were then lifted out, permitted to lie on this warm sterile gauze which covered the abdomen and the prepared field for a period of five minutes under similar conditions as above, then returned to the abdomen under similar precautions, and the wound sutured. The protective gauze was allowed to remain in place until we were ready to close the skin incision.

The differences were most marked. In each instance where the intestines had been in contact with tincture of iodine, adhesions were present between the loops thus exposed and other viscera within the cavity, these adhesions involving the entire portion of the bowel

which had been in contact with iodine. In the control cases, however, where the intestine had been protected from contact with the iodine for the same length of time, with the same amount and character of handling, there was in no instance a single adhesion present.

In preparing the abdomen of all the dogs operated upon, we followed as nearly as possible the same method as used in our operative work with such slight variation as would be unavoidable in operating upon animals. In the last series of experiments mentioned, there was omission of one detail which in our own work we always observe; that is, the operative area was unprotected in the five experiments necessary to determine the effect of contact of viscera with the prepared field. Our method in brief is as follows: The patient's abdomen is shaved in the ordinary manner twenty-four hours before the operation, or if preparation be necessary within as short a period as twelve or fourteen hours before the operation, the shaving is done dry. The field of operation is washed with benzine followed by alcohol, and painted with 3 1/2 per cent. tincture of iodine; that is, the officinal tincture diluted with an equal quantity of absolute alcohol. After this has been permitted to dry, a sterile dressing is placed over the field, and the painting with iodine in like strength and protective dressing repeated early in the morning on the day of operation. After the patient is placed upon the operating-table and the sterile gauze removed, the field is once more painted with iodine in similar strength. Emergency cases are taken into the operating-room at once, the skin is either shaved dry or after being moistened with alcohol, then washed with benzine followed by alcohol and painted with pure tincture of iodine instead of the dilution.

The methods of preparation in our experiments, to be of any value in determining the effect of iodine, must correspond in every detail to that which we use in operative cases, and such having been the case we are forced to conclude that the effect in actual work would be similar to that obtained experimentally.

Notwithstanding our own opinions and some reported experiences, together with the results of our experimental work, we find that clinical results seem to differ from those which we have obtained experimentally. Thus we find, in the *Southern Medical Journal* for March, 1913, that Crisler and Johnson, of Memphis, Tennessee, report having for several years used iodine applied directly to the peritoneum. They employ a mixture of iodine tincture and alcohol, leaving out the iodide of potassium which the official tincture contains, the strength being 33 1/3 and 50 per cent. This solution is utilized

for irrigating the peritoneal cavity, large quantities being used as will be noted by the following quotation from their report:

"What we most wish to bring before you is the fact that first, we are using the above mentioned 'half-and-half' in all cases of peritoneal infection; whether it be localized from an unruptured gangrenous appendix or other source, or whether the peritoneum is wholly infected, it makes no difference. We simply 'put out the fire' with this mixture and disregard infection thereafter. If we have a ruptured gall-bladder, for instance, as soon as this is discovered at the operation and before the incision is extended further, we literally pour a quart of this mixture into the abdomen and thoroughly sift it into all of the recesses. We do not fear the use of too much of the mixture; our only fear is that some pocket or interspace between the coils of intestines or elsewhere might escape us. If the case is already one of acute, general, fulminating peritonitis, we are even more liberal with the flushing out and washing out process with 'half-and-half' mixture. If in our judgment a quart will do, that is all that is used, though we have sometimes used as much as a gallon. This applies equally to any other infection whether it be a ruptured appendix with its consequent peritonitis, local or general, or a gunshot wound, or a ruptured bladder, or any other infection from the pelvic organs, or a perforated ulcer, or what not."

These authors state that the peritoneum is always irrigated with iodine solution proportionately to the extent of the infection, and that it has enabled them to feel perfectly contented as to the outcome of any case of peritonitis or of peritoneal infection, provided the treatment can be used before the patient is actually dying from the disease. They believe their completed statistics will show a mortality even in diffuse peritonitis of less than 2 per cent.

There seems to be a vast difference in the local effect of tincture of iodine in the infected and normal peritoneum, and as already stated we now have in progress further experiments to determine this difference and if possible the reasons therefor.

From our work experimentally and from our clinical observations with iodine in the preparation of the field for abdominal operations, we would conclude, That though Tr. iodine is effective as a means of sterilizing the skin it has its disadvantages:

That should the intestines come in contact with the iodine, adhesions will undoubtedly take place in the area thus exposed, due to the action of the iodine as an irritant to the peritoneum;

That when Tr. iodine is used as a means of preparing the field, the utmost care should be taken to avoid such contact by protecting the

field beyond the abdominal incision by means of moist pads securely fixed in place;

That under no circumstances should iodine or its tincture be poured into the peritoneal cavity;

In the normal peritoneal cavity iodine in alcoholic or aqueous solution is in sufficient quantity distinctly toxic.

DISCUSSION ON THE PAPERS OF DRS. REDER, JONES AND FRANK.

DR. ROBERT T. MORRIS, New York City.—In regard to Dr Jones' second case, I think we must keep in mind the fact that in some of the desperate cases of recurring malignant disease, Coley's serum is of value. Even though the percentage is not large, it is nevertheless definite, and being definite must be kept in mind.

I had one case of adenocarcinoma of the ovary which recurred almost immediately; it became very large, the tumor reaching almost to the navel, but now has disappeared completely under the use of Coley's mixed toxins. We must keep that in mind.

Dr. Frank's paper is timely at this moment. I do not know why it is so difficult to impress the profession with the idea that bacteria which are doing most damage are not in the pus or fluid that is free in the peritoneal cavity. They are chiefly in the tissues, and the pus itself may be good nutritious albuminous fluid; if you can get the patient to absorb a whole lot of such abdominal pus, she will be fatter and better for it. (Laughter.)

As to the use of iodine in these cases. When the surgeon first began to use iodine freely, I was working on rabbits at the time, and found it was convenient to avoid shaving the rabbit. By applying iodine to the skin I could work rapidly and do what experimental work was in order. Everyone of these rabbits was found to have firm strong peritoneal adhesion of the bowel at the line of incision later. We now know that the use of iodine freely in this way at the time of making the incision is injurious. Then I noted quite a deal of local irritative peritonitis, not infective, in cases in which iodine was employed upon the skin before going into the abdomen of patients, and immediately devised the plan of removing all free iodine with alcohol carefully before cutting the skin. If we use iodine for skin sterilizing purposes, it is one of the best resources we have at the present time, but we must remove it with alcohol after it has been upon the skin for two or three minutes. After removing all free iodine, we may go through an area with our knives without danger of carrying it to the peritoneum.

In regard to the toxic feature. When we were all using iodoform, and when everybody could recognize the surgeon on the street by the odor he carried about with him, the doctor required neither badge nor button for identification. In those days we occasionally had an "unaccountable death" from the use of iodoform gauze in

the peritoneal cavity. We knew certain patients had an idiosyncrasy against iodoform, and we now know that idiosyncrasy corresponds to anaphylaxis, or a better term is allergy, and quite a number of patients are allergic to the influence of iodine. Patients who are allergic to the influence of iodine may sometimes be killed by a few grains as surely as if you were to fire a bullet through their hearts. Of course, the proportion of such patients is small, but if it is your brother or a member of your family who is allergic to iodine, you would not care to have iodoform used in that particular peritoneal cavity. In the second place, it is unnecessary in the peritoneal cavity and that is the most important of all. We must remember that we depend upon hyperleukocytosis for meeting bacteria in the peritoneal cavity. We may use antiseptics but not germicides. All germicides are injurious. All germicides injure the plasm of body cells quite as definitely as they injure the protoplasm of bacteria. Organic cells are composed of protoplasm. The cells of your patient are as much living organisms as are the bacteria, and whatever destroys the cell protoplasm of a bacterium will at least injure the cell protoplasm of the patient. Certain antiseptics, which are not germicides, boracic acid, benzoic acid, chinosol and a number of other antiseptics do not injure the protoplasm, but will inhibit the development of bacteria. The beef trust showed us that by immersing meat in a 1/4 per cent. solution of benzoic acid it would then keep much longer. A mild antiseptic will prevent or inhibit the development of bacteria. We do not need germicides. Do not use any germicide whatever in the peritoneal cavity, as it is dangerous. It took the profession some three or four years before it began to realize that as a whole, and it will be about seven years before we will all be familiar with the fact. Let us begin now—some of us! Do not use germicides in the peritoneal cavity. Use antiseptics then occasionally, but antiseptics which are not germicide.

DR. JAMES E. KING, Buffalo.—I think Dr. Frank has proven experimentally what some of use have proven to our own satisfaction clinically.

There is one point in connection with the use of iodine that in my experience has been extremely interesting and illuminating, and that is in regard to the use of iodine catgut. Ever since iodine catgut has come into vogue I have been a routine user and believer in it, but I had an experience a short time ago which shook my faith in it as an advisable ligature for intraabdominal work. I had the misfortune to open the abdomen a second time a few days after the primary operation, and I was perfectly surprised to see along the line of suture of the peritoneum that in two places the gut had become adherent from a large knot and loop of catgut, and that adhesion was due to free iodine in the suture and causing irritation of the peritoneal covering. The advice Dr. Frank gives in regard to covering the abdominal wall after the use of iodine I thoroughly believe in. This precaution I have taken. On one occasion I returned to the abdomen and found it quite discolored as the result of contact with the iodine on the abdominal wall, and whether or

not I got adhesions in that case I have not been fortunate enough to learn.

Those who visited the clinic of Franz in Berlin were perhaps rather surprised, as was I, to find that he has discarded practically all preparation of the abdomen previous to laparotomy. His preparation consists of simply a bath the day before and at the time of operation—cleaning the abdomen with alcohol, I believe we are on the crest of a tidal wave of iodine, and I believe Dr. Morris has very well said we are coming to realize its limitations, and while it has a place, its free use and its use without good judgment is going to bring disaster.

DR. J. H. CARSTENS, Detroit.—In reference to Dr. Reder's paper, I will say that we have virtually settled the question more than thirty years ago, but I think it is a good thing to bring up this matter once in a while because younger practitioners will forget the serious conditions that may sometimes result from a lacerated cervix.

The cases reported by Dr. Jones are peculiar and very unusual. We all run across them now and then, and it takes considerable experience to manage these cases and in some instance to make a diagnosis.

Dr. Frank has done such valuable work experimentally that any paper from him we are always glad to listen to. If there is anything I have trouble with it is the use of iodine. When I go to some new hospital or any hospital for that matter to operate, where I do not operate very often, I find the house physician prepares the patient, and the first thing I know he has applied iodine all over the abdomen. When I find they do that I talk to them very sharply, and they do not forget it. But if I talk to them in my sweet, oleaginous way they will soon forget it. If they put on too much I make them take it off with a little ammonia. Personally, I just wash the skin with simple soap and water, followed by alcohol, and I can show the collaterals, by having as few deaths from surgical work as anybody. Everyone seems to be more or less of a faddist in the use of iodine. Everything is iodine, iodine. What is the result? I find that there follows its use a lot of trouble, such as postoperative vomiting, adhesions, and obstruction of the bowels. So iodine is a dangerous thing in my opinion.

There is one point with reference to sewing up the abdomen, and that is, I do not sew up the skin; I fasten it with plaster. The skin holds nothing. If the fascia is good, everything holds. If a patient should go away and the abdomen opens up, a skin suture will not hold. I plaster it over with a little plaster, and I have a beautiful scarless wound, if the case is clean and aseptic. I could never see the object of using iodine ligatures and chromicized ligatures, and formaldehyde or any other kind of ligatures. What I want is a sterile ligature that will absorb quickly. Chemicalized sutures may act as dead material, that may cause irritation in two or three months. Dr. Morris has shown that tissues are firm in fifteen or sixteen days, and a little stronger ligature without any chemical will do just as well, and it is just as good as your chemically prepared

ligatures. I can see one use for iodine. If I were a general surgeon and had a lot of accident cases, with dirty fingers and lacerated wounds, I could see how iodine might disinfect the parts where you cannot wash them very well, but it certainly is not good in ABDOMINAL SURGERY.

DR. FRANK D. GRAY, Jersey City, N. J.—It certainly requires some temerity to stand up after some of the last remarks and defend the use of iodine. But speaking as one who has done some surgery for a good many years before iodine came into vogue, and who has gone through the iodine period up to the present time, and remembering my results formerly and those at the present time, I must say I do not like the abuse of iodine more than I do the abuse of anything else. It is a rather curious phenomenon of the world that the pendulum swings back and forth, and it is quite evident from some of the remarks to-day that the pendulum has started to swing back from iodine. I think the trouble with iodine is, as I have remarked, the abuse of it. I would not say use less iodine or wash it off after you have used it. I should be inclined, on the other hand, to suggest that many of us do not use iodine at the proper time for skin sterilization. Two or three minutes' contact with iodine does not sterilize the operative field. I had an unfortunate mishap two years ago when operating on a case of double inguinal hernia. I prepared both fields at the same time just prior to my operation. I operated one after the other. There was no reason why there should have been any infection on either side; it was a clean operation; the same technic used; the same instruments; the same suture material; the same ligature material, and all that. The left side, which I operated first was infected. The right side, which I operated secondarily was not infected. The only way I can work that out was that the iodine had had time to produce some effect on one side and not sufficient time on the other. Since then I have iodine applied several hours in advance of the operation in elective cases and then apply it again upon the operating table. Where I cannot have the preliminary preparation of iodine, I have come to use gasoline to cleanse the surface, and right there is the crux of the matter of getting an iodine dermatitis. So many operators wash off the skin surface with water and apply iodine later, and are likely to get dermatitis. Iodine, water and skin are not congenial, but if the surface is prepared by dry shaving and iodine applied, or the surface prepared by gasoline and iodine applied, one will not get a dermatitis.

As to the possibility of damaging the peritoneal surface by contact of the iodine, there is no trouble about that. If you use the simple precaution of applying towels to the edge of the skin incision by the Moynihan clamps, you will get no contact with iodine at all. I think we have little cause to fear intraabdominal infection in our clean cases anyway. It is the abdominal wall infection that bothers us. It is the skin infection, the stitch abscesses, and sometimes the deeper wall abscesses which are the result of that. The suggestion of Dr. Carstens to plaster the skin is a good one. We can accomplish

the same thing by resorting to the Michel clamps picking up the outer layers and not passing the sutures through the skin into the subcutaneous tissues.

DR. JONES (closing the discussion on his part).—I will simply say, the first case was interesting to me from a pathological standpoint and from the infrequency with which we find solid tumors of the parovarium. Most of these tumors are of a cystic nature, and it is rare to find a solid growth.

Another point is the advisability of operating whenever we find a tumor. We still find plenty of physicians who when they find tumors say, Oh, let it go and see what happens. A tumor of this type is prone to become malignant.

The second case I reported also illustrates the advisability of operation, and I want to impress upon the general practitioner the advisability of operation when he detects the presence of a tumor.

This case was one in which we suspected a fibroid. It was allowed to go on for more than a year and upon operation we found it to be a sarcoma. I believe in these cases the earlier the operation the better it is for the patient.

DR. FRANK (closing the discussion).—Some of the points which have been brought out in the discussion are mentioned in my paper, which I did not take the time to read in full. Dr. Morris struck the keynote of the whole business regarding the intraperitoneal use of tincture of iodine when he says: *There is no necessity for it.* We are going through the same proposition with tincture of iodine that we did with bichloride of mercury. It brings up the question, in my mind, Why did men turn their attention so quickly to the use of iodine preparation? Was it because they were dissatisfied with their results by the old methods of preparation. A good many of us have been seeing wound suppuration very infrequently, others may have seen it more frequently. Was it for this reason they sought better methods of skin sterilization? It certainly was not on this account that we began the use of iodine. We tried it out, believing it was an additional good method and also for the purpose of comparison. Our method of preparation of the field with iodine is similar to that which Dr. Gray describes, first using gasoline or benzine to wash the skin, getting out all fat. We make our application of iodine twelve hours before operation, and see that no water comes in contact with the skin for some hours previous to the time set for the application. The skin is washed with benzine, followed by alcohol, and a 3 per cent. solution is painted over the field, a sterile gauze pad is applied and the next morning this is repeated, and finally in the operating room the skin is painted again with a 3 per cent. solution. The entire field is protected after the incision by moist pads fixed to the wound margin. We have found this absolutely necessary in abdominal work. In our experiments we studied the results with and without it to see what the effect of contact of the painted iodine with the intestine would be, whether it would be injurious or not. The results speak for themselves. With the old method of preparation we washed the field

with soap and water and alcohol. Where the washing was done on the table, we had a sloppy table and this is not the best thing for the patient.

We have in emergency cases used absolute alcohol alone. It must be used sufficiently thoroughly to get the skin clean. I think in the hands of the general run of the profession, particularly those who have not had thorough training, we have a distinct advantage in the use of tincture of iodine as a means of skin preparation previous to operation. I have never used iodine gut. We use for all intraperitoneal work, except intestinal, the smallest size chromic gut compatible with safety, and for intestinal work we use fine silk or fine Pagenstecher linen. For closure of the abdominal wound we use chromic catgut but not of large size, never larger than No. 1. We have no catgut in our operating room larger than No. 2. Plain catgut used for the control of the blood-vessels within the peritoneal cavity would not be advisable under all circumstances, as I think there is some danger of its digestion and early absorption, and a probable secondary hemorrhage.

EXPERIMENTS

Dog. No. 1.—Wt. 5700 gm. June 19, 1913. Dog was in good shape. There was poured into the peritoneal cavity 2 ounces of official tincture of iodine. The dog died five minutes later.

Autopsy showed peritoneum dry and glazed—all tissues stained and in places appeared as though charred.

Dog No. 2.—Wt. 4780 gm. June 19, 1913. There was poured into peritoneal cavity 5 c.c. of official tincture of iodine. On June 20 the belly was hot and tender. Dog was killed on June 24, 1913.

Autopsy showed abdominal wound infected. Omentum was nfiltrated with pus, thick and distinctly adherent. Intestines were adherent to this mass. Intestines hemorrhagic (probably due to formation of new blood-vessels). There was no evidence of iodine. infection was limited.

Dog No. 3.—Wt. 8750 gm. Injected 8 c.c. of official tincture of iodine by hypodermic into peritoneal cavity. Dog was found dead the following morning. Abdomen was greatly distended. No autopsy.

Dog No. 4.—Wt. 7440 gm. June 20, 1913. Dog was etherized. Injected by hypodermic 8 c.c. of official tincture of iodine into peritoneal cavity. The dog was found dead June 22. Belly was distended. There was no autopsy.

Dog. No. 5.—Wt. 13,400 gm. On June 20 injection was made by hypodermic of 20 c.c. of official tincture of iodine into peritoneal cavity. No ether. The dog went into shock. Appeared later to recover but died in an hour after injection was made.

Autopsy shows injection had been made into the spleen. At point of injection into spleen tissue is necrotic. All abdominal veins distended.

Dog No. 6.—Wt. 10,800 gm. June 20, 1913. Morphia. No ether. Before injection dog was in good shape. Injected by hypodermic 6 c.c. of official tincture of iodine. The dog was immediately in pain. Was found dead the following morning.

Autopsy showed the stomach greatly distended with gas—about the place of injection parietal peritoneum was dry. There was marked congestion of blood-vessels of mesentery and omentum also of bowel in places. No adhesions.

Dog No. 7.—Wt. 6670 gm. Injected 2 c.c. of official tincture of iodine by hypodermic into peritoneal cavity on June 25. On the 26th of June dog was apparently all right. Was killed by chloroform. July 7 (twelve days later) weight then was 5660 gm.

Autopsy showed parietal peritoneum at point of injection was reddened. Omentum was represented by a mass measuring 8×2 cm. Intestines in this region were bound together by adhesions which were somewhat firm and not easily broken up. Mass of omentum was adherent to the bladder.

Dog No. 8.—Wt. 3855 gm. On June 26 there was injected 2 c.c. of official tincture of iodine by hypodermic into peritoneal cavity. The following day the abdomen was rigid and tender. Weight July 7, when killed, was 3060 gm.

Autopsy showed a mass in the center of the abdomen below the ensiform composed of intestines bound together by rather firm and well-organized adhesions. Several lobes of the liver were attached to this mass and on breaking up these adhesions pus wells out from one of the lobes of the liver giving the picture of typical liver abscess. (There were two abscesses of the liver.) The purulent material has caused distinct adhesions about the right kidney producing a typical picture of perinephric abscess. The injection in this case was a right lateral one.

Dog No. 9.—Wt. 7940 gm. There was injected into peritoneal by hypodermic 4 c.c of official tincture of iodine on June 26, 1913. During injection there was an outcry and incontinence of feces. The following day the belly was slightly tender. Dog was killed on July 7 (eleven days later). Weight then was 5350 gm.

Autopsy.—Parietal peritoneum at point of injection was mottled red and yellow and somewhat thickened. (The redness was probably due to new blood-vessels). The omentum and intestines were massed into a large and rather adherent mass. The coils of the

intestines were separated with some difficulty. The omentum which was firmly adherent to some of the intestinal coils, enclosed a yellowish material which had the appearance of the iodine previously injected. Kidneys were apparently enlarged.

Dog No. 10.—Wt. 6910 gm. There was injected into peritoneal cavity on July 3, 1913, 3.5 c.c. of official tincture of iodine by hypodermic. The dog was killed on August 7, 1913.

Autopsy.—At site of injection of the iodine parietal peritoneum was greatly thickened. The intestines and omentum were adherent tc this place and to each other forming a mass the size of a man's fist. The bladder was also adherent to this mass. Adhesions were old and firm.

Dog No. 11.—Wt. 7150 gm. Morphine. There was injected on July 3, 1913 by hypodermic 4.5 c.c. (2/3 c.c. per kilo wt.) of official tincture of iodine into the peritoneal cavity. On July 10, 1913, the dog died.

Autopsy.—In the center of the abdomen was a mass 10×3 1/2 c.c. composed of omentum and intestines which were closely adherent. The adhesions were firm and well organized. The mass was adherent to the bladder below. The blood-vessels of the omentum were congested. In the abdomen was a large amount of fluid. At point of injection of iodine the parietal peritoneum was reddened and thickened.

Dog No. 12.—Wt. 6300 gm. Dog was injected on July 3, 1913, by hypodermic 2.1 c.c of official tincture of iodine into abdominal cavity (1/3 c.c. per kilo wt.). The weight of the dog on August 7 when killed was 3690 gm.

Autopsy.—At the site of the injection of the iodine the omentum and gut were adherent to the body wall. The parietal peritoneum was greatly thickened. The mass which was adherent to the site of injection was composed of several loops of the intestine closely bound together. Obstruction of the bowel was not complete.

Dog No. 13.—Wt. 6140 gm. Injected into abdominal cavity on July 3, 1913, 4.6 c.c. of official tincture of iodine (3/4 c.c. per kilo wt.). Dog was in pain. It died the morning of July 5 (two days later).

Autopsy.—The belly was full of brown turbid fluid. The parietal peritoneum about the point of injection of iodine showed marked congestion. Its luster was still present. The omentum was markedly congested. The diaphragmatic peritoneum was congested and yellowish. Near the upper fixed end of the gut was a perforation the size of the end of the little finger. At the site of the perforation

was a mass in the bowel the size of the end of the thumb and was composed of hair, etc. No adhesions in the abdomen. No sign of any iodine. The fluid in the belly had no odor (or if so very slight).

Dog No 14..—Wt. 7900 gm. Injected on July 8, 7.9 c.c. of official tincture of iodine into the peritoneal cavity. On July 9 the belly was warm and slightly rigid. Dog was found dead 9 A. M. on July 11, 1913.

Autopsy.—The fatty tissue of the abdominal wall on the right and the midline above the penis was very edematous. The parietal peritoneum, where the injection had been made, was slightly congested. In its upper left quadrant the spleen showed a tumor the size of a hickory nut which was soft and necrotic. About this were a few slight adhesions to the omentum. The spleen showed other tumor-like bodies in the center of its substance and also white infarcts. Heart showed a sclerotic valvulitis. Liver was pale—central veins congested. Left kidney showed tissue firm, surface pitted, capsule thick and adherent. There were no abdominal adhesions or any sign of iodine. The injection had been made through midline just above penis.

Dog No. 15.—Wt, 7200 gm. On July 8 there was injected by hypodermic 7.2 c.c. of official tincture of iodine into the peritoneal cavity (1 c.c. per kilo wt.). The dog died July 17 at 2.30 P. M.

Autopsy.—On the abdomen was found a great area of suppuration which did not extend through the abdominal muscles. The parietal peritoneum appeared normal. The peritoneum of the intestines was dry and somewhat sticky and lusterless. The omentum covered the intestines and its blood-vessels were congested. There were no adhesions. There was no sign of iodine present.

Dog No. 16.—Wt. 7650 gm. There was injected into peritoneal cavity on July 8, 7.6 c.c. of official tincture of iodine by hypodermic. It had the appearance of going into the tissue of the abdominal wall.

Dog killed August 7 (twenty-nine days later).

Autopsy.—In the abdominal wall where the injection had been made there was a great thickening of the tissues. On cutting through this mass free, clear, straw-colored fluid came out. Over this place the parietal peritoneum was greatly thickened. There were no adhesions in the cavity.

Dog No. 17.—Wt. 4180 gm. On July 11, 1913 there was injected into peritoneal cavity by hypodermic 5.25 c.c. of official tincture of iodine (1 1/4 c c per kilo wt.). The dog appeared to go into shock. It was found dead the morning of July 19, 1913.

Autopsy showed abdomen was full of serosanguineous fluid and

on the parietal and visceral peritoneum was some plastic material. The omentum was contracted and its blood-vessels congested. The mesentery was congested as was also the wall of the bowel. Some spots on the intestines appeared, as the peritoneum was here thickened. There were no definite adhesions present. There was some postmortem decomposition.

Dog No. 18.—Wt. 5710 gm. On July 16, 1913 there was injected 7.35 c.c. of official tincture of iodine by hypodermic into peritoneal cavity (1 1/4 c.c. per kilo wt.). The dog died at 5 P. M., July 18, 1913.

Autopsy showed abdomen was full of serosanguineous fluid. The parietal peritoneum in the lower abdomen appeared thickened. The omentum appeared contracted and between it and the intestines, over which it lay, there were fine, young adhesions. The peritoneum of the intestines was slightly glazed and between adjoining loops of the gut there were in places fine, young adhesions Plastic material was on the anterior surface of the liver and continued into the omentum. The right lobe of the liver was adherent to the right kidney. Heart dilated. Mesenteric glands injected.

Dog No. 19.—Wt. 3300 gm. Into the peritoneal cavity on July 16 was injected 4.1 c.c. of official tincture of iodine by hypodermic, (1 1/4 c.c. per kilo wt.) at twelve noon. At 2.30 P. M. the dog was found dead.

Autopsy.—In the cavity was a large amount of serosanguineous fluid. The parietal peritoneum was in fairly good shape. On the right side it appeared somewhat dulled. On the intestines it was dull and glazed. There was congestion of the blood-vessels of the intestines and mesentery. The omentum was stained yellow and its blood-vessels congested. The kidneys were large and soft. Liver was dark. Left heart hard and contracted. Right heart was somewhat distended with clotted and fluid blood.

Dog No. 20.—Wt. 6090 gm. On July 16 dog was injected at noon with 7.6 c.c. of official tincture of iodine by hypodermic into peritoneal cavity (1 1/4 c.c. per kilo wt.). The dog appeared to go into shock. He was alive at 4.30 P. M. but was found dead at 9 A. M., July 17.

Autopsy.—The abdomen was filled with dirty-looking, brown fluid. On the peritoneum in places was found a yellow-colored material. There appeared to be a small puncture in the intestines (made by hypodermic possibly). There are no adhesions. There was some thickening of the parietal peritoneum. The left heart

was contracted. The intestines were distended with gas and there was apparently much postmortem decomposition.

Dog No 21.—Wt. 4860 gm. On July 22 at 4 P. M. there was injected 6.1 c.c. of official tincture of iodine by hypodermic into peritoneal cavity. The dog was found dead at 10 A. M., July 23.

Autopsy.—Abdomen was filled with serosanguineous fluid. At the point of injection the parietal peritoneum appeared dry and wrinkled. Between the omentum and the intestines and between loops of the intestines were fine adhesions. The omentum and mesentery were congested. The omentum was stained yellow in a couple of places. Left heart contracted. Stomach was greatly dilated.

Dog No. 22.—Wt. 4850 gm. Injected 4 P. M. July 22, 6.1 c.c. of official tincture of iodine by hypodermic into peritoneal cavity. Dog was found dead at 10 A. M., July 23.

Autopsy.—The abdomen was filled with serosanguineous fluid. There were fine adhesions between loops of the gut and between omentum and gut. The omentum was injected. A patch on the intestines gave the appearance as though the iodine went into the bowel. In the bowel there was hemorrhagic material. Left heart was contracted. Stomach was greatly dilated.

Dog No. 23.—Wt. 4650 gm. There was injected at 4 P. M. on July 22, 5.8 c.c. of official tincture of iodine by hypodermic into peritoneal cavity. The dog died at 10 A. M., July 23.

Autopsy.—The abdomen was filled with serosanguineous fluid. The omentum and mesentery were congested. There were fine adhesions between omentum of gut and loops of gut. The peritoneum on the gut in places was dry and wrinkled. Left heart was contracted. Stomach greatly dilated.

Dog No. 24.—Wt. 7020 gm. There was injected at 4 P. M., July 22, 1913, 8.8 c.c. of official tincture of iodine by hypodermic into peritoneal cavity. Dog was found dead at 10 A. M., July 23, 1913.

Autopsy.—The abdomen was filled with serosanguineous fluid. There were no adhesions. The stomach was dilated. The liver showed a capsulitis and in places had the appearance of gas formation. The omentum and intestines were congested and the peritoneum on the gut felt dry and had a dry and wrinkled appearance. The kidneys appeared completely disorganized. Right heart was dilated and contained gas. Left heart was contracted. In pericardial sac was a blood material of fluid consistency. There had been infection with gas bacillus.

ALCOHOL DOGS (1 1/4 C.C. ALCOHOL PER KILO. WT.)

Dog No. 25.—Wt. 6730 gm. (chloroform to relaxation). There was injected 8.5 c.c. of 95 per cent. alcohol on August 13 at 10.30 A. M. by hypodermic into peritoneal cavity. Dog was in pain. Staggered when knocked from the table. Dog was killed August 15, 1913.

Autopsy.—Showed marked congestion of blood-vessels of the parietal peritoneum, mesentery omentum and gut wall. Omentum intestines formed a mass in the abdomen and were adherent to each other. Loops of gut were adherent to adjacent loops. The omentum was contracted and showed the presence of coagulated blood. The intestinal wall was roughened, injected and showed presence of plactic exudate. The anterior surface of liver was covered with plastic material. All the abdominal organs were congested. The belly contained serosanguineous fluid.

Dog. No. 26.—Wt. 6100 gm. Injected chloroform to relaxation on August 13, 1913, 7.6 c.c. of 95 per cent. alcohol by hypodermic into peritoneal cavity. The dog cried out so much that morphine was required. Dog was killed August 15, 1913.

Autopsy.—The belly was filled with straw-colored fluid. There was a small hole in the bladder wall. The parietal peritoneum was congested in places. The mesentery was markedly congested. Also the intestinal wall in places. The intestines were roughened. No adhesions were present. (Injection probably went into the bladder.)

Dog No. 27.—Wt. 5050 gm. August 13, 1913 (chloroform to relaxation). There was injected by hypodermic 6.3 c.c. of alcohol into peritoneal cavity. The dog went into shock. Later he whined frequently. Dog was killed August 15.

Autopsy.—Showed extraperitoneal hemorrhage where the needle had pierced blood-vessel. The abdomen contained a good deal of serosanguineous fluid. The parietal peritoneum was almost normal. The omentum showed congested blood-vessels. In one place there was a blood clot attached to it. The intestines in the lower abdomen showed marked congestion and roughening of the peritoneum. On the intestines at different points were bits of coagulated blood. The surface of the bladder showed marked congestion. There was a little plastic material present.

IODINE DOGS.—A.

Dog No. 28.—Wt. 5050 gm. On August 14, 1913 there was put into the abdomen 0.45 gm. of pure iodine through midline incision.

(This is amount of iodine per kilo contained in 1 1/4 c.c. of the official tincture of iodine per kilo. wt. of dog.) Dog was killed August 15.

Autopsy.—Showed abdomen contained a great deal of serosanguineous fluid. The parietal peritoneum near incision was roughened and stained with iodine. The intestines in places were stained and its peritoneum roughened. In places the blood-vessels of the gut were congested and also those of mesentery. The omentum in places was congested and stained with iodine. The spleen was stained with iodine and showed a capsulitis. The peritoneum about the wound showed marked congestion. The tissues of the abdominal wall showed marked iodine.

Dog No. 29.—Wt. 11,310 gm. On August 14 there was put into abdomen 0.99 gm. of pure iodine through midline incision. (This is amount of iodine corresponding to the amount of iodine in the official tincture when giving 1 1/4 c.c. per kilo wt. of dog.) Dog was killed August 27, 1913.

Autopsy.—Showed omentum, intestines and end of spleen tensely adherent to each other and to abdominal wound. The right kidney was adherent to the liver. There were fine bands from parietal peritoneum and diaphragm to the intestines, liver and kidney on the right side (these possibly normal). No iodine was found but the mass formed by intestines and omentum was not opened.

EXPOSURE OF LOOP OF GUT TO IODINIZED WALL.

Dog No. 30.—August 23. The abdomen was opened after preparing the wall with official tincture of iodine and allowed to lie in contact with the iodinized wall for five minutes. Replaced and incision closed. On August 25 the dog had a fit and appeared mad. On August 26 dog had a fit and was killed and buried. No autopsy.

Dog No. 31.—On August 25, 1913 the abdomen was prepared with official tincture of iodine and allowed to dry. Abdomen was opened. The abdominal wall was covered with wet sterile sponges (thickness of eight layers of gauze). A loop of intestine was brought out and allowed to lie in the sponges for five minutes. Replaced and incision closed. August 30, the dog died.

Autopsy.—The abdominal wound at its upper end was opened and contained pus. This wound did not communicate completely with the peritoneal cavity. The omentum was adherent to the wound at its upper end. There was no fluid in the cavity and no adhesions were present. The intestines were slightly glazed, otherwise normal. The peritoneum in upper angle of the abdominal wound was open but the wound was closed by the omentum.

Dog No. 32.—Aug. 25, 1913. The abdominal wall was prepared with official tincture of iodine. The abdomen was opened and a loop of intestine brought out and allowed to lie in contact with iodinized wall for five minutes. It was replaced and incision closed. Dog was killed Sept. 1, 1913.

Autopsy.—There were slight adhesions between the omentum and the abdominal wound. To the loop of intestine exposed we found the omentum adherent and loops of gut adherent to each other. The adhesions were fairly well formed. No other adhesions were found.

Dog No. 33.—August 25, 1913 the abdominal wall was prepared with official tincture of iodine, allowed to dry and the abdomen then opened. We then covered the edges of the wound and all with wet sterile sponges (eight layers of gauze thick). We allowed a loop of gut to lie on this gauze for five minutes, replaced and wound closed. Dog killed September 1, 1913.

Autopsy.—We found slight adhesions of the omentum to the abdominal wound. No other adhesions were present. Other abdominal organs were normal.

Dog No. 35.—September 4, 1913. Prepared abdominal wall with official tincture of iodine and allowed it to dry. We then incised the abdomen and brought out a loop of intestine and let it lie in contact with the iodinized wall for five minutes, replaced and closed the abdomen. Loop of intestine marked with chromic catgut. September 8, dog was killed.

Autopsy.—Congestion was found of the blood-vessels of the mesentery and of the walls of the loop of intestine exposed. Adhesions were present between the intestine and omentum and between different parts of the loop itself. When the adhesions were separated raw places were left and these bled. No other adhesions were present. Everything else normal.

INJECTION OF LUGOL'S SOLUTION.

Dog No. 37.—Wt. 5580 gm. On September 5, 1913, chloroformed dog to relaxation and injected Lugol's into peritoneal cavity by hypodermic 7.8 c.c. (1.4 c.c. per kilo wt. being used. This is equivalent in amount of iodine content to 1 c.c. of the official tincture of iodine per kilo wt. of dog). Dog suffered greatly and morphine had to be administered. Dog was killed September 11, 1913.

Autopsy.—We found the omentum contracted, congested and adherent to the intestines. The intestines were congested and the

loops firmly adherent to each other. The wall appeared raw. The parietal peritoneum on places was congested and thickened and in places it was slightly roughened. In one place the omentum was stained yellow. There is no evidence of iodine though the abdomen contained quite a bit of fluid and plastic material.

Dog No. 38.—Wt. 7200 gm. On September 5, 1913, dog was given morphine and chloroformed to relaxation. Then 10 c.c. of Lugol's solution were injected into the peritoneal cavity per hypodermic. The dog raised so much fuss that more morphine had to be given. On September 6, the dog was found dead.

Autopsy.—The abdomen was filled with serosanguineous fluid, the color of which resembled iodine. The omentum was congested and stained yellow. The parietal peritoneum at the point of injection was deeply congested. In other places it appeared normal. The intestines were congested and slightly roughened. The mesentery was congested. There were no adhesions. The kidneys were soft. The liver showed a capsulitis.

Dog No. 39.—Wt. 9130 gm. On September 8, the dog was given morphine and chloroformed to relaxation. There was then injected 12.78 c.c. of Lugol's solution into the peritoneal cavity per hypodermic (1.4 c.c. per kilo wt. This is equivalent in iodine content to 1 c.c. of official tincture of iodine per kilo wt.). The dog was found dead September 9.

Autopsy.—The abdomen was filled with thick bloody fluid and gas. The liver showed an infection with gas bacillus. The intestinal walls, mesentery and omentum were congested. There were fine adhesions between the omentum and intestines and between adjoining loops of intestines. In places the omentum was stained yellow. The pericardial sac contained thick bloody material.

CANCER OF THE UTERUS AND FIBROID TUMORS FROM A CLINICAL STANDPOINT.

BY

EDWARD J. ILL, M. D.,

Newark, N. J.

IT seems to me that I owe you an apology for bringing this subject before you. My paper is only a continuation of the discussion of Doctor Hall's paper of a year ago. I owe you the proof of my last year's assertion.

My remarks on this subject will be short, since the subject does not permit of lengthy argument. I trust, however, the paper will be freely discussed. In doing so I will ask you to give me facts and personal experiences, not impressions; nor is hearsay evidence of any value. I am giving you my personal experience, always of more value to ourself than the experience of others.

For years I have been under certain impressions which came from casual observation and not from actual figures. I began of late to get anxious if such impressions were founded on facts as corroborated by actual clinical data or whether I would have to recant. If it was the latter, my apologies are due to many for my errors.

I am therefore simply presenting to you the facts as they appear in my case-books, written up by myself and by many who have assisted me during the past eighteen years. I trust the records are as correct as such records can be kept. We are all well aware how our profession swings from one extreme to another. Any physician of prominence who can plausibly put before us some notions, no matter how fallacious, will surely find a large following irrespective of one's own experience and common sense.

Let me remind you of the indiscriminate removal of the ovaries for neurotic disease; the unwarranted removal of acute pus tubes; the Apostoli treatment of fibroid tumors and its baneful outcome. We are now in the throes of the indiscriminate curettages, frequently a harmful procedure, and the unwarranted removal of the appendix and fibromyomatous tumors.

When it was suggested that fibroids could or would eventually change into malignant growths or cause malignancy in other parts of the uterus, the onslaught on the innocent tumors received a new

impetus. Any woman can be scared into an operation by suggesting the possibility of malignancy.

The high mortality of the operation for fibroids early in the history of abdominal surgery deterred many from operating.

At this time, however, when the operation has become a very safe procedure, safer than ovariotomy for neoplasms, many cases are operated on that present no subjective symptoms and in a vast majority of cases never will. Thus in my records I find series of fifty-six to fifty-eight and eighty-four successive operations without a death. A peculiar fact has been elicited by the perusal of my records for eighteen years, that not a single death occurred in private house operations, nor any in the small country hospitals; sixty-seven cases have thus been operated on.

In a perusal of the autopsy records of hospitals, variously situated, it was shown that from 4 to 8 per cent. of all women over thirty have fibroid tumors. In other words, these neoplasms are exceedingly common. I have operated on 443 cases. There was not a single case among them that presented malignancy. Nor is there a single record of any patient who has returned with secondary malignant disease.

These are my personal experiences, not those of my colleagues in the same hospital service nor my assistants.

The vast majority of these cases were sent to the operating room from my own office and were so-called private patients. It was thus that many have remained under close observation and the result of such an experience is more valuable than the records of the perambulating ones.

Cases with distinct subjective symptoms or such objective symptoms as would presumably lead to severe complications were selected for operation. Nevertheless, there is no record of any fibroid having undergone malignancy.

It appears from my office case-book that there were recorded during this time 2600 cases of fibroids of which 443 were operated on, being about 17 per cent. Some may have been and likely have been operated on elsewhere. I do not think there were many since So many have remained under observation for years undergoing regular measurements and recorded examination. I have not heard of a single one that has become malignant.

During the same time there were 580 cases of carcinoma of the uterus, body and cervix, and one case of sarcoma of the body of the uterus recorded in my office case-book. Of these, 175 underwent some form of operation.

Of these operable cases, five contained from two to several small fibroids and two contained two small nonmalignant muco-polypi. Among the five cases, four were carcinoma and one had presumably sarcoma of the anterior wall. I say presumably because there was some doubt in the pathologist's mind and the case is of such recent origin that a recurrence has not yet taken place. This woman had several small fibroids in the posterior wall but came for symptoms referable to a beginning sarcoma. More than twenty years ago I operated on her for a retroflexed uterus by the Leopold-Czerny fixation and the sarcoma developed in the tissue underlying the fixation.

We have thus 2.8 per cent. of all cancer cases operated on containing fibroids, while the average of all women over thirty having uterus fibroids is from 4 to 8 per cent.; or fewer women with carcinoma of the uterus have fibroids than those without fibroids.

It is, therefore, my opinion that we have no moral right to place before our patients the possibility of these growths becoming malignant and thus scare them into an uncalled for operation.

It is my firm belief that these tumors never or very rarely undergo malignant change. Under any circumstances the change is not frequent enough to call for an operation as a prevention.

I think I am borne out in this by the opinion of even those who report malignant degeneration.

Even an expert operator, whose percentage of death is not more than three or four, has no right to suggest the operation when possible future malignant degeneration constitutes the only indication.

UTERINE FIBROMYOMATA OF THE LOWER UTERINE SEGMENT.

BY

JAMES N. WEST, M. D.,

Professor of Diseases of Women at the New York Post-Graduate Medical School and Hospital.

(With Three Illustrations.)

THE well-known difficulties of performing hysterectomy in cases where the true pelvis is well filled with fibroids have resulted in a mortality rate which is always quoted as being high. This has led the writer to present this short paper in the hope that it may offer a suggestion which may some times lead to simplification of the operation and a consequent lessening of the dangers.

The proportion of cases in which tumors growing from the lower segment more or less block the pelvis is given as about 5 per cent.

As soon as the tumor or tumors reach sufficient size to impinge upon the pelvic walls pressure conditions develop which manifest themselves by more or less serious symptoms.

The author's experience is that such tumors develop more frequently posteriorly than anteriorly or laterally

In case of the posterior development the body of the uterus is pressed upward and forward so that the cervix is forced against the pelvic arch catching the urethra between cervix and arch so firmly as to gradually interfere with the power of the bladder to empty itself, until finally the act of urination becomes impossible. This was the condition in all three of the cases herewith reported.

Other more or less serious complications may occur from pressure on the rectum, ureters or the vagina.

If the tumor develops very low it may form an absolute bar to labor; and pregnancy is not infrequent in uteri with fibroids in the lower segment.

Leaving out of the question, then, the propriety or wisdom of operating upon all fibromyomata when they have reached a distinctly appreciable size, those cases where the tumors are developing very low in the pelvis call for active interference, usually hysterectomy

Naturally in operating the first question to be decided is the route of the attack. This will be largely a matter of personal equation of

the operator, some preferring to do the work whenever possible by the vaginal route and others by the abdominal.

The writer has had the pleasure of seeing Dührssen, of Germany, remove very large tumors which were chiefly abdominal, by the vagina.

He disregards the size of the vagina and in nullipara, as well as multipara, begins his operation by boldly incising the perineum, vagina and levator ani and stretching the outlet to its fullest capacity, then separates the uterus from its anterior and posterior attachments and bisects it, dragging down the uterus and tumor by powerful traction, he removes all by morcellement. This method can undoubtedly be well applied when the tumor is of moderate size and lies low in the pelvis, but the writer deems it unwise and inexpedient, if the tumor is large and occupies not only the true pelvis but extends well up into the abdomen. It also has the great disadvantage of not offering a convenient and safe control of abdominal complications which so frequently are present.

The ideal route for operation is that which brings the operator most directly and conveniently to the greatest bulk of the tumor and allows him the best opportunity to deal with complications. This, in the case of large tumors, even where they fill the pelvis quite well, will be the abdominal route.

Nothing is more characteristic of the ordinary fibroids than the ease with which they may be shelled out from their beds by division of their capsules and traction upon them. It is this character which suggested to the author the performance of a preliminary myomectomy upon the tumor occupying the pelvis. The tumor in the true pelvis is the one which complicates the operation and displaces the pelvic structures.

The plan of procedure is to open the abdomen and expose the tumor or drag it out of the opening as far as possible. In the kind of cases referred to, it will be found impossible to deliver all of the tumor, it being held firmly down and the pelvis more or less filled by it. A careful survey is made and a point is selected where the peritoneum and capsule of the tumor may be readily divided without injury to any important structure or division of any large blood-vessels. The tumor is seized at a given point, freed of capsule, and firmly drawn upward while it is being shelled out from its bed. This can be done very quickly and with little or no loss of blood. After the true pelvis has been freed of the growth or growths in this way it is surprising to see how quickly the anatomical field assumes normal relations. Ureters, bladder and rectum sink and retract immediately

into their normal situations and the hysterectomy may proceed as in any ordinary case where the tumors are not from the lower segment. It is also surprising to find that sometimes the myomectomy alone will suffice and the sexual organs may be preserved for a patient, as illustrated in two of the following cases, which would not be true if one used the vagina as a route and began the operation upon the uterus by bisecting it.

Those tumors which, growing from the lower segment, become submucous and are pushed into the vagina, as fibromyomatous polypi, may be easily dealt with from the vagina The author has had two cases recently of tumors of this character of such size as to press upon the urethra to a degree that made urination impossible, the inability to pass water forming an urgent indication for operation and forcing patients otherwise unwilling to have operation to consent to it. Both of these patients refused to allow hysterectomy to be done, which was advocated on account of the presence of other fibroids in the uterus and both were completely relieved of their symptoms by the myomectomy and curettage. Notwithstanding this, the writer still believes their uteri should have been removed.

The author's observation has been that more large polypi occur in women who have borne children than in the nulliparous, and that more of the subperitoneal tumors of the lower segment occur in nulliparous than in parous women.

Among the cases under discussion three have been chosen as presenting features of especial interest and as being more or less typical of classes of cases.

In relating these cases only the important points and chief features will be mentioned.

CASE I.—An Italian woman, æt. forty-eight years, seen in consultation with Dr. A. Caturiani, October 10, 1907—Multipara. Menstruation for last two years profuse and irregular. Has been suffering for a few weeks from fever and severe pain in the left lower quadrant of the abdomen and pelvis. During this time she has had a gradually increasing difficulty in passing the urine until the last two days she has been totally unable to void it, and the doctor passed the catheter with great difficulty. Past history negative.

Physical Examination.—Heart and lungs negative. A hard irregular intra-abdominal and pelvic mass can be felt in the left iliac region. Vaginal examination reveals a dense mass occupying the hollow of the sacrum and pressing the cervix forward and upward. The finger can be inserted in the vagina with some difficulty between

the mass and the pubes. The mass feels to be continuous with the one above and all to be fixed immovably in the pelvis.

Diagnosis.—A tentative diagnosis was made of malignant disease involving the uterus and other pelvic organs, but with the reservation that the diagnosis was sufficiently doubtful to justify an exploratory abdominal incision.

Operation, October 13, 1907. Through a median abdominal incision a dense irregular mass running up toward the left iliac region was found and in attempting to break up adhesions a considerable quantity of pus was encountered. As we felt that we were probably dealing with a malignant process, the pus cavity was drained through the incision and the wound was closed except for the drainage point. The patient was then placed in the lithotomy position for the purpose of obtaining a specimen of the growth which filled the pelvis and impinged far down upon the posterior vaginal wall. Upon incising the vagina over the mass the dense glistening fibers of the mass showed it to be a fibroid. It was removed forthwith by morcellement and the cavity packed with washed iodoform gauze.

This patient made an uneventful recovery.

September 7, 1913, her husband reported to me that she was in excellent health.

CASE II.—An unmarried woman, æt. twenty-eight years, entered the Post-Graduate Hospital February 13, 1906. Menstruation regular but rather profuse. Had suffered moderate pain in the lumbosacral region for about two years, but considered herself very well until recently, when she began to have difficulty in passing urine. Now is totally unable to void urine and can only be relieved by catheter. Past history negative. Heart and lungs negative.

Examination of abdomen shows rounded masses resembling fibroids between pubes and umbilicus. Vaginal examination shows a large rounded dense mass filling the culdesac and pressing the cervix upward and forward firmly against the pubic arch and continuous with masses above.

Diagnosis.—Uterine fibromyomata with a large fibroid from the posterior pars intermedia of the cervix causing pressure against the urethra and retention of urine.

Operation February 14, 1906. An incision was made in the median line from the umbilicus to the pubes. In opening the peritoneum at a point three inches above the pubes the bladder was incised for a distance of 1/2 inch, this was immediately closed with two layers of catgut. The peritoneum was then incised and the mass liberated and drawn out toward the pubes by forcible traction. The true

pelvis was so blocked by the lower part of the growth as to make operation quite difficult. A convenient point of peritoneum over the pelvic tumor was selected and incised. After incision through its capsule this tumor was easily shelled out, when the anatomical relations became much simplified and a supravaginal hysterectomy was

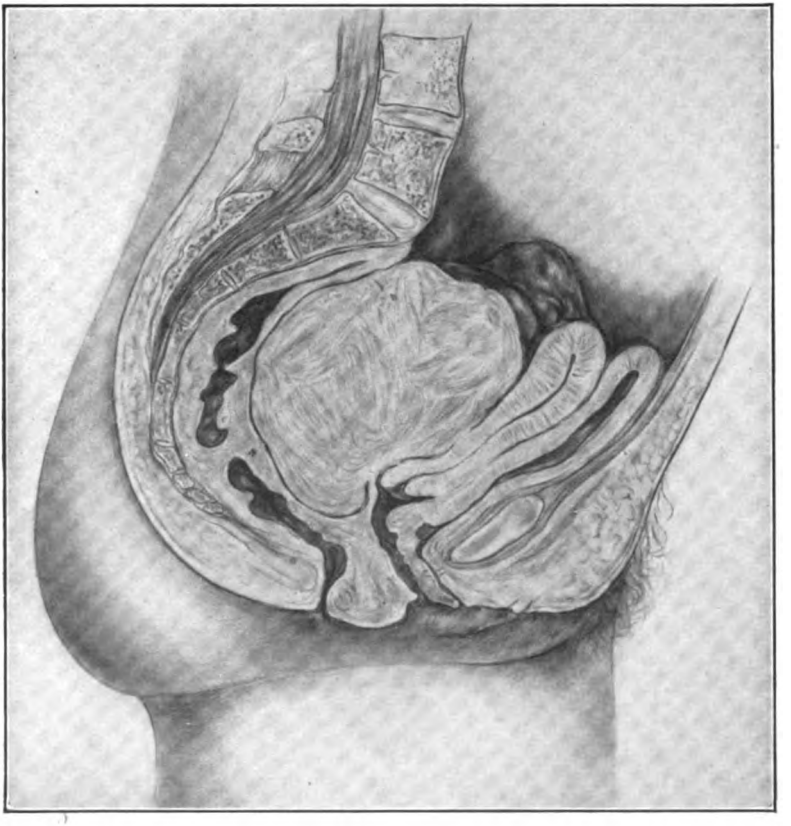

FIG. 1.—Fibroma of pars intermedia displacing pelvic organs and completely obstructing the urethra by pressure. Preliminary myomectomy followed by hysterectomy. Recovery.

easily performed after the usual method. This case made an uneventful recovery.

CASE III.—Mrs. N. R., æt. forty years. Multipara. Was admitted to the Post-Graduate Hospital October 31, 1912. Patient was five months pregnant and complained of no especial discomfort except that recently she had a gradually increasing difficulty in passing the urine and an uncomfortable feeling of pressure in the

pelvis. Five days ago she had ceased to be able to pass the urine and had to be catheterized. The attendant being no longer able to pass the catheter she was hurried into the hospital. Past history negative.

General physical examination negative. Bimanual examination showed a five months pregnant uterus lifted high up by a dense fibroid tumor occupying the culdesac and compressing the urethra firmly between it and the pubic arch.

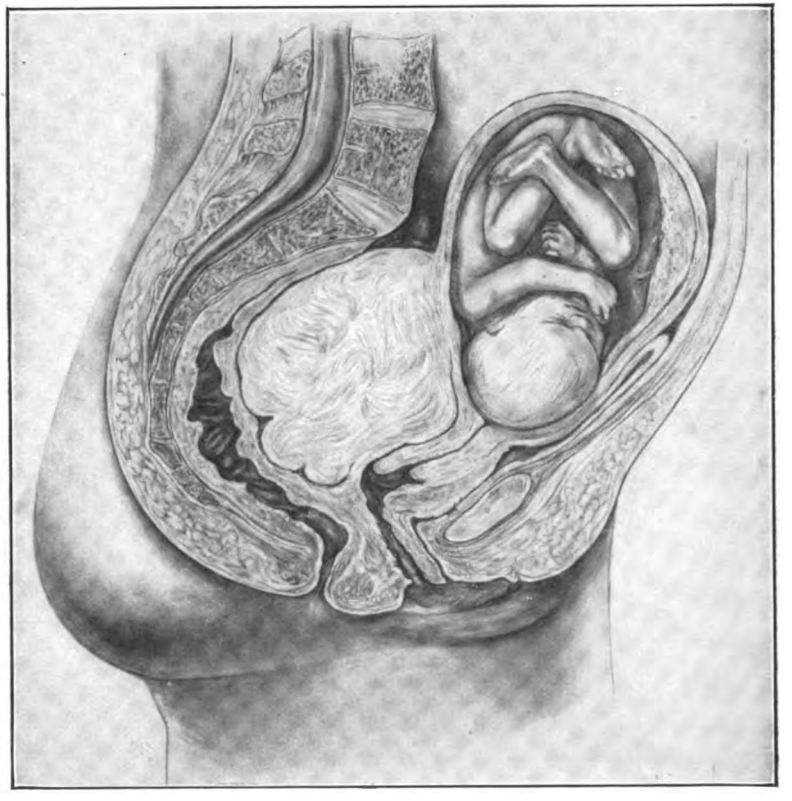

FIG. 2.—Five months pregnant uterus with fibromyoma from pars intermedia pressing uterus upward and forward and completely blocking urethra by pressure. Myomectomy and myotomy. Rocovery without loss of any organ.

Operation November 1, 1912. A median abdominal incision was made and notwithstanding that it was recognized that the bladder must be much displaced upward and an attempt to incise the peritoneum at a point sufficiently high to avoid it was made. An incision was made into the bladder. This was immediately closed with a double layer of catgut. The peritoneum was incised and the preg-

nant uterus was delivered through the wound by the hand. A large fibroid arising from the lower segment was seen filling the posterior part of the pelvis. This was apparently the only tumor present. Incision of the peritoneum and capsule over a convenient point of the tumor was made and the tumor shelled out. The wall of the

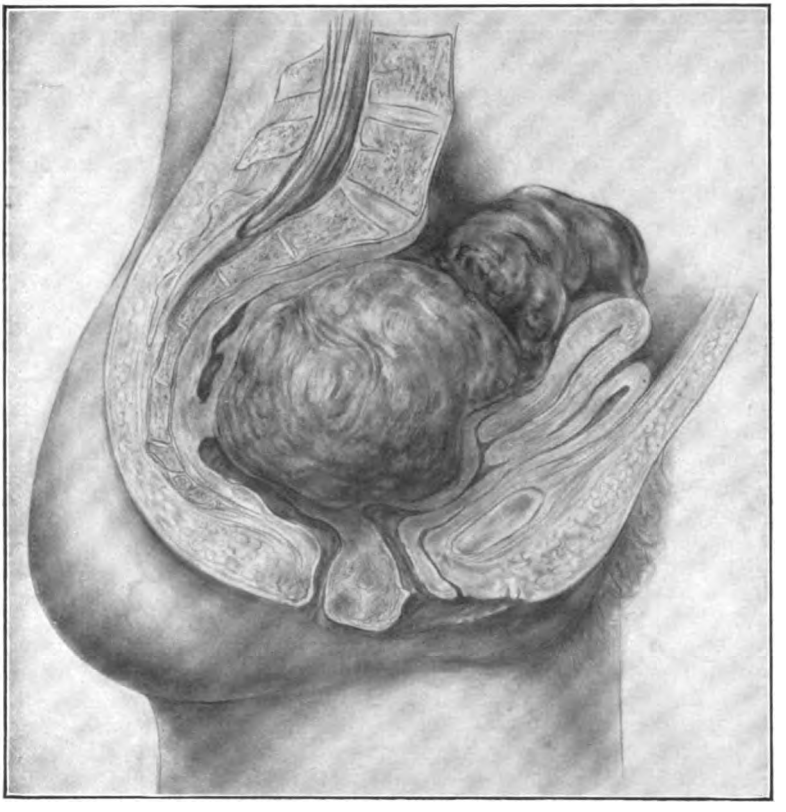

FIG. 3.—Fibroma of the pars intermedia developing posteriorly. Complete blocking of urethra from pressure. Pyosalpinx of left side. Drainage of pyosalpinx through abdominal wound; removal of tumor through the vagina by morcellation. In perfect health eleven years later.

uterus was so thinned at one point that membranes presented. The opening was enlarged from below upward by incision and the fetus membranes and placenta were removed and the uterus curetted lightly through the wound. The wound was closed as in Cesarean section and the abdominal wound closed without drainage. Except for a leakage of urine through the abdominal wound for a few days,

the patient made an uneventful recovery and was out of bed on the fifteenth day.

The points of interest and instruction in these cases are so numerous that I shall call attention only to the following.

(1) That cases of fibroid tumors of the lower uterine segment occur with moderate frequency where operation is an immediate and urgent necessity on account of pressure upon the urethra.

(2) That cases occur where fibroids in the lower segment complicated by inflammatory conditions closely resemble malignancy, and that such cases should have the benefit of an exploratory incision.

(3) That a preliminary myomectomy may often allow structures to assume a more normal anatomical relation and thus simplify operation and reduce the danger.

DISCUSSION ON THE PAPERS OF DRS. ILL AND WEST.

DR. HERMAN E. HAYD, Buffalo.—This is a very interesting subject to us because we have all had a reasonably large experience in dealing with these cases. The subject is interesting because fibroid tumors are so common and the mortality associated with surgical intervention is so low, practically nil. It is surprising how these tumors, as the Doctor has said, grow. We have one uterus in which the whole structure is simply one intramural mass of fibroid tissue; another uterus which is filled with small tumors the size of a pea up to perhaps the size of two fists or larger. We know how they can grow, sometimes in the top and how they often grow in the lower segment, and how they often extend into the broad ligament, and they may extend so much transversely as to wedge themselves into the pelvis and then it is with the greatest difficulty we can deliver them sufficiently to do the necessary surgery. Perhaps the suggestion as given us here by Dr. West may be a valuable one in connection with some of these cases—that is to do a myomectomy first, but it seems to me, in order to do his operation you will get into as much difficulty as you would have had in delivering and clamping and ablating the fibrous uterus. The difficulties in connection with these cases, as the doctor has shown us are great, first of all, because they are so firmly impacted in the pelvis, and secondly, are difficult on account of the resistance offered in pulling them up. We get hold of these tumors with a large tenaculum, they can only be pulled up a little distance and then they fall back again, in fact it is difficult to get them up far enough to put clamps on the broad ligaments.

Sometimes I have had the greatest difficulty in putting a clamp on, but after you get one clamp on the ligament it is easy to slip another along side of it and then with a knife you can cut between them and thus set free the one side of the broad ligament and then you are able to deliver the tumor sufficiently to make the rest of the operation comparatively easy. One can then push a forceps between

the folds of the peritoneum after first lifting the anterior flap and catch the uterine artery and cut off the cervix with the Kelly spud and then the other side can quickly be taken care of. I have been very much impressed with this method of procedure. I never try any more to separate the peritoneum posteriorly from the uterus. First of all, it is too hard to get it off. It tears and breaks away, and secondly, it is unnecessary. You can get as much peritoneal covering as you require from the anterior flap to cover the stump satisfactorily.

The doctor has called our attention to a point which I think is very important, namely, the necessity of remembering that many of these cases only produce bladder symptoms.

I have a woman, who is at the present time in the Deaconess Hospital, upon whom I operated. She had been visiting in Buffalo and came from Elyria, Ohio, but on account of having so much trouble with her bladder she consulted me. I suggested that she undress and let me examine her to see what the condition might be. She thought that was quite unnecessary, but I told her I should not give any medicine until I examined her. I examined her and found a fibroid much larger than my closed fist pressing upon the urethra and producing these urethral and bladder symptoms. She had no other symptoms whatsoever. She had been treated for months with various diuretics and bladder sedatives.

Another point in connection with these cases is the necessity of always catheterizing these women who have a tumor low down in the pelvis, because it often presses on the bladder and makes an hour-glass bladder. The nurse will catheterize her before she is brought to the operating room, emptying the lower portion of this hour-glass contraction, and leaving a lot of stinking dirty urine in the upper portion of the bladder, making the operation additionally difficult, and if we, at the same time, cut or injure the bladder we may let loose a lot of this infectious retained material. It is necessary to always catheterize carefully these cases where the growth is in the lower segment of the uterus.

I am very much obliged to Dr. West for bringing up his suggestion because it may be useful sometimes, but it seemed to me when the doctor was reading his paper to deliver such a tumor by myomectomy low down in front or behind would be about as hard to do as it would be to put clamps on and separate the uterus.

So far as Dr. Ill's paper is concerned, it is not difficult to persuade patients with fibroid tumors to be operated upon when you tell them the tumor is apt to turn into a cancer, but we all know this is not true, except in the smallest percentage of cases. A few years ago normal salt solution was used in great amounts, 18 to 20 pints in twenty-four hours, and the patient often got at least 2 or 3 ounces of pure salt which was not a good thing for him. Now we are told that ordinary tap water is more quickly absorbed in the rectum and acts even better than the salt solution. Our ideas will soon right themselves with reference to the degenerations which occasionally take place in fibroids. Dr. Noble did a

good work along these lines, but I am sure he was carried away by his own enthusiasm and that his conclusions were much above the mark. I agree with Dr. Ill, fibroid tumors very rarely undergo cancerous degeneration. However, I removed two uteri during the past year that contained numerous fibroids from the size of a pea to an egg, and on the top of the uterus of one of these cases one of the fibroids as large as a big egg had become cancerous, and in the other case the tumor which was in the body of the uterus became malignant; nevertheless, in the face of this experience I am not justified in scaring every woman who has a fibroid into an operation, upon the grounds of future possible malignancy. Dr. Ill's statistics are very striking and he has had a very large experience; he says of over 2000 women operated upon by him only 2 1/2 per cent. had cancer, while 4.8 per cent. of all women have fibroids.

DR. MAURICE I. ROSENTHAL, Fort Wayne.—From a surgical standpoint these fibroid tumors springing from the lower segment of the uterus and cervix are in a class by themselves. I here have a photograph of such a tumor weighing 35 pounds. An operation for the removal of such tumors occasionally becomes a most formidable procedure taxing the skill and experience of the operator to the utmost.

To deliver such a tumor is practically impossible. Springing from the uterus below its peritoneal covering in its growth it lifts the peritoneum with the bowels and sometimes the ureters and in this case even the stomach. The operation itself becomes a combination of enucleation and hysterectomy. A method to a certain extent like that suggested by Dr. West. The circulation, even in this large tumor, is from the uterine arteries. These once secured, together with the parasitic vessels which have formed from the overlyi ıg peritoneum, the operation becomes a bloodless one.

The first necessity was making accessible the uterine vessels. This was done by mobilizing the tumor. The peritoneum was split over the tumor and stripped off. This was a somewhat bloody procedure as the tumor was a rapidly growing vascular fibromyoma. Clamps were applied freely. As soon as the tumor could be delivered sufficiently to lift it up into the abdomen the uterus and the broad ligaments which had heretofore been impacted in the pelvis became accessible. The operation was now concluded as an ordinary hysterectomy. As soon as the ovarian and uterine vessels were secured the remainder of the operation was practically bloodless.

In these cases it is necessary to preserve sufficient peritoneum to be used as a plastic in covering the immense denudation left by the removal of the tumor. One should also be very careful lest such a tumor, as it rises from the pelvis in its growth, carry with it the ureters. In this case the ureters were pushed well to either side.

I have a brief history of this case on the back of the photograph together with a diagram showing the relations of the uterus and bladder. Operation, St. Josephs Hospital, Sept. 16, 1912. Mrs.

L. Burbon, Ind., aged fifty-two years, multipara, five children. Menstruated at fifteen years. Hemorrhages the last four years. Pain and bladder symptoms increasing until finally quite unbearable. Upward pressure from tumor causing shortness of breath and vomiting. Urinary symptoms intense. Catheterization very difficult, practically impossible. Fever and chills for last two weeks. Operation Sept. 16, 1912, followed by rapid recovery.

DR. K. ISADORE SANES, Pittsburgh.—I do not believe that any one of us would operate now on symptomless tumors. If a patient comes to the surgeon with a tumor it generally means hemorrhage or pressure symptoms. Shall we operate on these cases or shall we not? Dr. Ill's statistics of 2.8 per cent. of carcinomas in the fibroids to my mind speaks for operation. If a mortality of 2 per cent. for fibroid is the usual result of an operation for fibroids, then the 2.8 per cent. of carcinoma found by Dr. Ill shows he would have had a higher mortality among his patients had he not operated on them. Besides, out of the 400 cases he operated on, if he had let them alone, a much larger number than the 2 1/2 per cent. would have developed carcinoma. I think, therefore, the statistics given by Dr. Ill do not speak against operative interference in fibroid cases. There is another point I want to call your attention to. From our experience we cannot be certain that the 97.2 per cent. of the uterine fibroids operated on by Dr. Ill and found by the laboratory to be uncomplicated fibromas had no early carcinoma. The uterine tumors sent routinely to a laboratory with a clinical diagnosis of fibroid, are not, and cannot be studied sufficiently to definitely exclude carcinoma. For th s reason, the statistics of laboratories in such cases cannot be relied upon to give us definite conclusions as to the frequency of carcinoma in uterine fibroid.

Fibroids unquestionably are dangerous when they cause profuse hemorrhage and pronounced pressure symptoms. They are also a source of danger d ıring pregnancy. It is true that fibroids complicating pregnancy are not as dangerous as we have been led to believe. Many of these fibroids lift themselves out of the pelvis during labor and some of them, softened by edema, flatten out by the pressure of the child's head so that delivery follows without complications. But we recall in our practice a case of fibroid so obstructing delivery that it had to be removed before forceps could be applied; also a case of an abscess that developed in a fibroid after delivery and operation had to be performed to save the patient's life. Then there is the postpartum hemorrhage from the fibroid uterus. We cannot say offhand how many of such cases we had, but we know of one that died before anything radical could be done. We do not think anyone operates now on symptomless fibroids, but patients that present themselves with symptoms should be operated on, or good reasons should be given why we should not operate with a mortality of 2 per cent., and with Dr. Ill's statistical observation of a mortality of 2.8 per cent. or more from carcinoma in fibroids not operated upon.

As to myomectomy followed by a secondary hysterectomy in diffi-

cult cases, we think that if we enucleate one or more fibroids as a preliminary step of the operation, the uterus can often be delivered easily and we can then easily do the hysterectomy.

DR. J. H. CARSTENS, Detroit.—As far as these fibroids are concerned, they are difficult to deal with. When you cut down through the peritoneum and through the fascia, try to get down on the fibroid; you very often do not cut deep enough. You try to peel out the fibroid, but you are just peeling out some of the layers of the thick pelvic fascia; cut down deep enough and get right upon the fibroids, and then you can peel it off easily. If you start to peel it from the uterus to the pelvis, you work against all blood-vessels and tear them. If you start on the outside, you work along with the blood-vessels themselves and separate them without tearing them.

So far as the paper of Dr. Ill is concerned, it is always good to have Dr. Ill with us and now and then to shake us and check us in our advance. We are prone to go too fast. There is too much I think being said about fibroid tumors developing cancer, but I am sure that Dr. Ill and everyone of us have seen cases of fibroid tumors of the uterus, and if we have not seen the fibroid uterus ourselves, by the history we know these patients had fibroid tumors of the uterus for thirty years. The family physician will tell you that, but then all at once the woman develops some serious symptoms, and you operate on her and you will find it is a malignant growth. You have all seen that. You have seen a fibroid tumor in a young girl perhaps twenty-five years of age and that remained there for twenty-five years, and all at once she develops a cancer of the breast. Now, that does not say necessarily that because she had a fibroid of the uterus she developed a sarcoma or carcinoma. We have no right to say that because a woman developed a fibroid or fibroid tumors in the uterus which have been present for thirty years that they will develop into a carcinoma or sarcoma. You might as well say it is sarcoma whether he has had any fibroids or not, or there was a sarcoma planted on top of that.

I had a case six weeks ago of a young woman with a fibroid of the ovary as large as my fist. When I opened the abdomen quite a little fluid came out; there was some ascites. I took the tumor out easily, and sent it to the laboratory. The pathologist said to me that it was a fibroid, a plain simple fibroid of the ovary. I said to him, "That is a malignant tumor." That woman had ascites, and when I find ascites, I am suspicious of malignancy, and I believe it is cancer or sarcoma. I wanted him to make another examination, and the other day he came up and looked over the specimen, said it was an interesting case and was undoubtedly malignant. Now, gentlemen, you cannot fool a man of experience with all your laboratory work, and that is all there is about it. There is something in the clinical symptoms and something in our knowledge and experience that we get which enable us to say that this is or this is not cancer. The question to me is this: cancer may have been implanted on top of the fibroids. It may be independent; it may be

that the *cancer has been brought about by the irritation from the fibroid or fibroids.* Notwithstanding this, I do not think there are as many cases of malignancy following fibroids.

DR. LOUIS FRANK, Louisville.—It seems to me, Dr. Ill's paper is very timely, although I do not think his statistics prove his contention. If we consider the cases in which carcinoma occurs in fibroids in the percentage he mentions, I should say the presence of fibroids has nothing to do with the occurrence of carcinoma. If a woman has a fibromyoma of the uterus, I do not see any special reason why that woman should have a carcinoma implanted upon it. We may have carcinoma implanted on a fibroid independent of the uterus the same as we have a fibroid breast with cancer in the uterus. It shows no necessary relation at all. In my experience I have had cases where these two conditions have been concurrent in the same individual. I have found that in some cases carcinoma of the uterus has begun in the mucosa; that these tumors were not pure mural tumors but rather of the submucous order and the mucosa has been very much thinned out, and it is from this reason possibly the belief originates that these tumors undergo carcinomatous changes. There is a great difference between carcinomatous degeneration and the concurrence of carcinoma and fibroid in the same individual. In a fibroma of the breast of the canalicular type we have a different character of growth. We have cells lining the ducts thrown into activity, and there is great opportunity, on account of cell activity, for carcinoma to develop.

I have met with several of these tumors just as we all have. You separate the bladder first and tie off the uterine vessels, separate the vagina, and have the whole thing at your disposal and under control, and the tumor is lifted out and the operation is completed. I merely secure the uterine artery and isolate the ureters as the primary step in the operation, and one is enabled to do that with ease. As Dr. Rosenthal has said, enough peritoneum should be left to peritonealize the whole structure, and drainage should be established through the vagina by puncture to drain the dead area.

DR. CHARLES N. SMITH, Toledo.—As regards this question of myomectomy in fibroids versus hysterectomy a question which often presents itself to me is, are we doing the best for the future of our patients in doing a myomectomy for a large fibroid? A myomectomy which consists in simply enucleating a pedunculated fibroid or making a small conical incision into the uterine wall and separating the fibroid is one thing. We can leave the uterus in a splendid condition with complete restoration of anatomical structure and of function, and the woman may become pregnant and go on to labor successfully; but where we have a sizable fibroid in the uterine wall, where we incise the uterine wall to enucleate that tumor, to remove some of our redundant tissue and quilt down and close the ragged cavity in, the question is, are we doing the best thing for our patients? Are we doing for her the fair thing? Are we not subjecting her to as much risk in that myomectomy as in

doing a complete hysterectomy, and are we leaving her any better off after leaving that multilated uterus in the abdominal cavity? Truthfully, none of my patients on whom I have done myomectomy to any extent have become pregnant. More than one of them have returned suffering from discomforts of one kind or another which have led to a hysterectomy. That is to say, they have solicited hysterectomy. I have one such case in mind at the present time where a fibroid, lying on the posterior wall of the uterus under the bladder, caused so much bladder disturbance that a myomectomy was done. That patient has never been comfortable since that tumor has been removed. She has been relieved of some of the bladder symptoms, but not all, and she is coming to me and soliciting hysterectomy. It seems to me, in these large-size tumors that, unless there is a desirability for pregnancy, we had better do hysterectomy at once than to do myomectomy with the possibility of hysterectomy being forced on the patient later.

DR. LEWIS F. SMEAD, Toledo.—These cases of cervical fibroid or fibroid in the lower uterine segment, must be divided into two distinct classes, those that are in the vagina, and those that are in the abdomen. In quite a number of these cases the fibroid is entirely within the vagina either primarily or because it has sloughed through the vaginal wall.

During the last year I have had two of these cases with the fibroid in the vagina, one a small one, the other an enormous fibroid weighing 20 pounds. I found it quite a simple matter to cut the large tumor to pieces and remove it through the vagina. I had to put my arm into the vagina nearly to my elbow to reach the lower end of the cervix.

The other type of case is that in which the fibroid is entirely within the abdomen under the peritoneum. In quite a number of these cases the uterus is perched up on top of the tumor, and the whole question to my mind is how to get one's bearings. To do this one must locate the point at which the tumor has arisen from the uterus and the junction between the vagina and cervix. This can be done very easily by passing a sound into the vagina from below. Having located the junction of the vagina and cervix, the rest of the structures can be readily found. It may be found necessary to open the vagina at the base of the cervix and work upward as in the Doyen hysterectomy.

I think that Kelly's method of bisection of the tumor is valuable. I believe that the point of locating the junction of the vagina and cervix is the key to situations in attacking these tumors.

DR. WALTER C. G. KIRCHNER, St. Louis, Missouri.—I want to speak of one observation in connection with fibroids and cancer, and the point was brought out by Dr. Frank's remarks that we may sometimes find cancer associated with a submucous fibroid. That brings up the matter of hysterectomy and supravaginal amputation. In two or three instances where supravaginal amputation was performed for large fibroids, the complicating condition of cancer of the cervix subsequently developed, and it appeared to me, since

others also have had similar experiences, that in these cases in which we have multiple fibroids, and especially where we suspect submucous fibroids, it is better to do a total hysterectomy than to do a supravaginal amputation.

DR. THOMAS B. NOBLE, Indianapolis.—I have been denied the privilege of hearing these papers on account of coming in too late, but there is one thing that has not been brought out in the discussion that I would like to mention. I believe that every fibroid tumor of the uterus should be judged upon its merits. I believe that these tumors should be accused of guilt until they are proven innocent. We all know that these tumors themselves undergo malignancy and malignancy springs up in the uterus along with them, both carcinoma and sarcoma.

Relative to the method of operation, I think it is pretty generally practised that the cervix shall be left. Supravaginal amputation is pretty generally in vogue. I make that statement from cases I have examined that have been operated by my confreres in my own city and elsewhere that I have run across.

I have had the unpleasant experience of having four cases of inoperable carcinoma present themselves following supravaginal amputation, one occurring two years or more after an operation that I had performed myself for fibroma, leaving the cervix. The three other cases were operated upon by other and competent men. Fibromata clinically can be malignant though histologically they may be nonmalignant. Fibromata produce cardiovascular changes that have not been mentioned yet, which render them as highly malignant as if they were histologically so found, especially those that are largely of the myomatous variety.

Unquestionably if each of us would look over our records we would find we have lots of cases of this type, soft tumors, that we can account for only on the ground that there is a secretion from these growths in the body, producing a chronic myocarditis or katamorphic change in the muscle of the heart whereby sudden death, without apparent cause, occurs. I have had several cases in which following a clean operation, a simple operation, as good an operation I believe as I have ever done, sudden death occurred during the first three weeks following the operation from cardiac failure, so I think we must project our vision into the future and scan very candidly each and every one of these fibroid tumors, or fibroid masses, whether they be myofibromatous or fibromyomatous, before we pass them by and let them go unoperated.

DR. ILL (closing the discussion on his part).—There is no question at all about the interchangeability of neoplasms in families. By that I mean that one member of a family subjected to neoplasm will have an epithelial growth and another a cellular neoplasm. Some years ago I related before this society the story of a family of whom I have a record of 100 years, where, during that time, there were six cases of carcinoma and two of fibroids and one of teratoma. Five of these cases I saw myself. There is no question at all that a patient who has a neoplasm of the cellular tissue, of the muscular

tissue, or bone tissue, is just as liable to have a neoplasm of the mucous membrane or cutaneous surface. When he gets a neoplasm of the mucous membrane it is likely cancerous. When he gets a neoplasm of the cellular tissue, it is possibly sarcomatous or only a benign process. I contend however that when a patient has a benign tumor, that tumor rarely changes into a malignant one, when the original tumor originates in cellular tissue. It seems quite different in neoplasms of epithelial origin.

Professor von Recklinghausen, who was my teacher years ago, spoke very definitely of that. A sarcoma would never change into a carcinoma. The structures are entirely different.

Dr. Sanes did not speak of the 2200 cases we have not operated on none of which returned with malignant changes, but merely referred to the cases on which we operated. I do not care to guess what might occur to the operated cases so long as I can show that they remained well. My brother has probably had a larger number of operations, than I have and he has never seen a tumor change to malignancy. I have seen many of the cases he operated on. I have given you the combined experience of two men in over 800 cases, and no malignant degeneration in the growth itself has occurred. I did not intend to say, if I did say so, that a person with a fibroid cannot have a malignant growth elsewhere, but I meant the tumor itself becomes malignant very rarely.

I am simply considering my own personal experience. I have the history of some patients for thirty years, and I have not seen a case of fibroid become malignant. You must take your own personal examination and not that of anyone else, if you want to be fair to this important question. I have never seen a cancer of the cervix follow supravaginal amputation.

The cardiovascular changes are due to two conditions: first, inability on the part of the patient to exercise because the tumor is producing pain, and second, hemorrhage. These are the cases that call for operation. Degeneration of the heart always follows hemorrhagic cases. It does not follow a simple uncomplicated fibroid which you accidently find when a patient comes to you for some other symptoms.

DR. WEST (closing the discussion).—I am going to ask you to be good enough to extend your ideas beyond those suggested by these very suggestive pictures. I picked out a series of cases which were interesting, each individually, and on account of certain conditions and collectively on account of the common symptom of blocking of the pelvis and blocking of the urethra. These represent three cases from a considerable number of such cases. I may say these three cases would seem to be the least amenable to a myomectomy which we have to do occasionally to clear up the condition and make the anatomical relations plainer.

The first case which suggested this idea to me was one like that of Dr. Rosenthal. It was an enormous tumor which grew to the diaphragm and caused complete blocking of the pelvis. I cut off the tumor and cut off a considerable portion of the peritoneum because

the intestines and other organs were attached to the enormous fibroid. If I had a fibroid growing from the left side and pushing the bladder off and ureter to one side and could see a space of peritoneum there, I would incise thoroughly right through the capsule and shell that out in half a minute, and the bladder and ureter would sink down, and I would go ahead with a hysterectomy. That has been a help to me, and I might add as a suggestion, thinking some other person when he finds difficulties and finds the anatomical relations distorted might shell out the tumor and make it very much plainer for himself. These cases were rather unpromising for a myomectomy, yet in all three of these cases I did a myomectomy. One woman is now in a perfectly healthy state without loss of uterus, ovaries or tubes, and only a loss of the tumor. The second one had a large tumor which was removed by morcellement, and seven years afterward she was perfectly well. The third woman lost her uterus because it was so injured and pulled to pieces when I got through with my myomectomy I did not feel it safe to leave it behind.

OBSERVATIONS BASED ON SEVENTY CASES OF BOWEL OBSTRUCTION WITH SPECIAL REFERENCE TO THE UNUSUAL CASES.

BY

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I DESIRE in this paper to review the results of some seventy cases of bowel obstruction on which I had occasion to operate, and to present briefly reports of cases which illustrate some of the more unusual types of obstruction and emphasize certain points in diagnosis and treatment. Those surgeons who have been obliged to operate on cases of bowel obstruction must be impressed not only with the seriousness of the condition, but also with the unfavorable results which follow in the wake of a delayed diagnosis and late operation. It is on this account that the subject is of such great importance, and anything that will help to clear up the cause and nature of the various bowel obstructions, should be of service in making an early diagnosis and in instituting the proper treatment.

For our purpose, it will not be necessary to enter into a discussion of the various classifications of ileus, but chiefly to bear in mind that the passage of the intestinal contents may be impeded by various causes, and that as a result of either stasis of bowel contents or of impariment of bowel function, or both, grave constitutional results are apt to ensue.

Intestinal obstruction, when situated entirely within the abdominal cavity, is frequently referred to as ileus, and when it occurs in a pouch external to the abdominal cavity, the condition is usually known as strangulated hernia. Since strangulation may occur as readily within the abdominal cavity, and since in the main the symptoms and the treatment in both may be similar, there is no good reason why strangulation outside of the abdominal cavity and the symptoms which are thus produced, should not be considered with a discussion of bowel obstruction. Strangulated hernia is but one phase of the general subject of bowel obstruction.

Those obstructive conditions which are usually referred to as ileus, are designated according to their causes as (a) adynamic ileus, and (b) dynamic ileus. In adynamic ileus, there is absence of power

of propulsion, and this may be due to an interference of the nerve control (spinal or mesenteric), to an involvement of the intestinal wall, or to impairment or infiltration of the muscular coat of the intestine.

In dynamic ileus, there is some mechanical form of obstruction which produces strangulation or obturation. Obstructions belonging to the first group on account of the behavior of the bowel, may well be called paralytic ileus, and those of the second group, mechanical ileus.

From the operative standpoint, it is well to have a clear idea as to the cause and nature of the obstruction, for if it be mechanical the obstruction may be relieved, whereas if the obstruction be due to an involvement of the nervous system, reflexly or otherwise, operative measures may avail but little or, indeed, may not be indicated.

Taking the entire group of cases into consideration in which bowel obstruction occurred, the following observations were made:

Cause of obstruction	Number of cases	Bowel resection	Enterostomy	Mortality rate
Hernia	47	15	2	29.8 per cent.
Various (nonhernias)	23	1	3	52.0 per cent.
Postoperative adhesions	10	1	1	50.0 per cent.
Preoperative adhesions	4	.....	1	50.0 per cent.

The appendix was implicated in the obstruction, six times, or in 8 per cent. of the cases. Interstitial (concealed) hernia was encountered twice. Enterostomy was performed seven times or in 10 per cent. of the cases with six deaths, while resection of bowel was performed eighteen times in 25.7 per cent. of the cases with five deaths (27.7 per cent.). However, with two exceptions, the resections were in the hernia cases. Strangulated hernia with symptoms of bowel obstruction occurred in 10 per cent. of the cases operated on. Other cases of obstruction requiring operation were, stricture of the rectum, carcinoma of sigmoid, fibromyoma of intestine, intussusception, volvulus, gall-stone, cysts of mesentery, thrombosis of superior mesenteric artery, prolapse of bowel through mesentery, prolapse of bowel through omentum, visceroptosis and incarcerated Meckel's diverticulum.

Most of the cases operated on were encountered at the City Hospital, and the great majority when received had been obstructed for some time and were in a critical condition. The prognosis in the

cases of strangulated hernia was better than in other forms of obstruction, and this, no doubt, was due to the external location of the obstruction, which makes the diagnosis easier and hence encourages earlier operative interference. In many instances, the operation was undertaken as a last resort with the hope of giving the patient the only opportunity for recovery.

It may prove of interest to report a few of the cases that seemed unusual and which may serve to call attention to certain points in diagnosis and treatment.

CASE I.—*Intussusception caused by Fibromyoma of Intestine.*—The patient, a white female, twenty years of age, married, entered the hospital with a history of severe pain in the abdomen. She had been sick for four days. Her trouble started with severe cramps in the abdomen and backache; the pain was most severe in the region of the umbilicus and was exacerbated when turning on her side. She had never had any abdominal pain previous to the present attack, but since then it had been constant. She had taken enemas and cascara, but had had no bowel movement since the beginning of the attack; however, at the hospital, an enema was followed by a slight passage containing blood. Her appetite, as a rule, was good. On the day that she took sick, she had eaten liberally of canned corn and beans. During the past four days she had vomited frequently, the vomitus becoming fecal in character.

There was nothing unusual as to the habits of life and the family history was negative. She had the usual diseases of childhood, but gave no history of bowel trouble or peritonitis. For the two months previous to the attack of illness, she had to take medicine to make her bowels move. The tongue was moist, coated brownish in the center, but clear around the edges.

The abdomen on inspection showed a fullness to the right of the umbilicus; the respiratory movements were about the same on either side. There was but little tenderness on palpation, and muscular rigidity was slight. On deep pressure, there was pain in the region of the umbilicus, though no distinct mass or tumor could be felt. The entire abdomen was tympanitic, except over the region to the right of the umbilicus. The stomach was distended with gas.

The heart action was rapid and the pulse rate, 124, respirations, 34, temperature, 100.8°. Blood examination showed leucocytosis, 16,500; the urine contained albumin and hyaline cysts. From the history and symptoms a diagnosis of intussusception was made and the patient was prepared for operation.

Operation.—A median incision below the umbilicus was made. The intestines were distended with gas and on examination, at a distance of about 2 feet from the ileocecal valve, the intestine was found telescoped, producing an intussusception. The proximal bowel contained liquid feces and gas. By gentle compression from behind and traction, the intussusception was relieved and at the beginning portion, a tumor-like mass, the size of a walnut and somewhat pedunculated, was detected in the lumen of the bowel. The tumor was removed through an incision in the bowel, and the bowel on either side of the tumor having been properly clamped, the incision could be closed without soiling the peritoneal cavity. A glass drainage tube was inserted into the pelvis and the abdominal wall closed in layers.

The patient stood the operation fairly well but continued to vomit material of a fecal odor. Stomach lavage had but little influence on the vomiting and eserine did not relieve the intestinal distention; the patient became cold and clammy, the pulse more rapid and weak and the temperature rose gradually to 106°. She died twenty-four hours after the operation. A microscopical examination of the tumor showed it to be a fibromyoma.

CASE II. *Obstruction of Bowel due to Impacted Gall-stones.*—The patient, a female, entered the hospital in a critical condition and gave a history of vomiting spells for the past week. The abdomen was not greatly distended, though she had characteristic symptoms of bowel obstruction.

Operation.—Median incision was made from the umbilicus to the pubes. The small intestines, which presented themselves, were collapsed. A systematic search for obstruction was made, and about half way along the intestine, a mass blocking the entire lumen of the intestine was found. Proximal to the obstructing mass, the intestine was distended.

The foreign body was removed and it proved to be a huge gall-stone shaped somewhat like a top. The incision in the intestine was closed with a double row of sutures. The gall-bladder region was involved with dense adhesions, but the patient's condition did not warrant further exploration.

The abdomen was closed in layers. The patient died a few hours after the operation.

At autopsy the gall-bladder was found agglutinated to the duodenum. A large stone, the other half of the one removed at operation, had ulcerated through the gall-bladder into the duodenum and was located high up in the intestine.

CASE III. *Obstruction of Bowel caused by Strangulation in the Sac of a Properitoneal Hernia.*—The patient was a colored man, forty years old, a fireman by occupation, well nourished and well developed. He entered the hospital with a history of appendicitis. His respiration was rapid and shallow, the pulse rapid and thready. The abdomen was tense. There was tenderness near the right inguinal region. A diagnosis of bowel obstruction was made and the possibility of hernia with reduction *en masse*, was considered. However, there was no definite evidence of hernia. He took sick five days before coming to the hospital and for the past four days had vomited material which was fecal in character.

Operation.—Incision along right rectus was made and on opening the bowel which was of a brownish-red color, was found distended with gas and fluid fecal matter. In the region to the right of the bladder a mass about the size of a fist was encountered, and it was learned that this mass was a sac which contained strangulated bowel. The ring of the sac was severed in a direction toward the median line and the contents of the sac which was gangrenous, was brought forward, and 2 1/2 feet of bowel were resected, anastomosis being made with the Murphy button. While the resection was being made, the proximal portion of the intestine was drained by means of a rubber tube fastened in the gut. The sac was examined and no communication could be found between that and the external or internal ring. The sac was brought forward with forceps and sutured, a rubber drainage tube having first been put in place. The abdomen was copiously irrigated, and the wound closed with drainage. The patient was put to bed in a critical condition. He died suddenly on the fourth day after the operation, apparently from heart failure which was contributed to by a general septic condition.

CASE IV. *Symptoms of Bowel Obstruction caused by Richter's Hernia.*—This patient gave all the symptoms of bowel obstruction, although the cause of the obstruction could not be ascertained. He was growing weak and believing that the condition was associated with a right inguinal hernia, which, however, was reducible, he was submitted to operation. A radical operation for inguinal hernia was performed; the bowel was examined, but nothing was found to account for his condition. After the operation the symptoms persisted, and he died as if from obstruction of the bowel. At autopsy, a small knuckle of bowel, involving only a part of the wall, (Richter's hernia) was found impacted in the inguinal ring on the left side, producing, however, no external evidence of its exist-

ence. The case illustrates the necessity for more extended exploration, when the seat of the obstruction is not evident.

CASE V. *Obstruction of Bowel in a Case of Right Inguinal Hernia of Large Size, Complicated by Cysts of the Mesentery.*—The patient, a colored male, aged thirty-six, was well developed and a yard-man by occupation. He stated that he had noticed a rupture on the right side for nine years, and up to two years ago, had worn a truss. The hernia was of large size, but on the day previous to his admission to the hospital, after heavy lifting, the hernia became still larger and could not be reduced. He came to the hospital in a critical condition. He was prostrated, pulse 110, respiration 30, temperature 100°, abdomen distended, and he had vomited several times. The hernia was as large as an infant's head and ineffectual efforts at reduction by taxis had been made. It was evident he could only be relieved by operative measures.

Operation.—An incision was made, as is usual in hernia operations, and the sac opened up. The loops of bowel were densely adherent to each other and to the sac, and the sac contained the cecum, omentum, as well as a great portion of the small intestines. The operation was complicated by the presence of several cysts of the mesentery, and the large bowel had been stripped of its peritoneal covering, evidently in efforts at forcible reduction. The condition was so serious and complicated that a supplementary median incision was made and the afferent portion of the small bowel near the involved area, was anastomosed into the sigmoid. The patient's condition on the table was such that it was thought best to leave the contents of the sac intact, and when put to bed his chance for recovery was bad.

The patient died twelve hours after the operation. At autopsy it was ascertained that the sac contained 6 feet of small intestines which had been densely matted together. There were also two mesenteric cysts, one the size of the fist, the other the size of a goose egg. Since the hernial ring was smaller than the mesenteric cysts, naturally it was impossible to reduce the hernia. At the constricted portion, there was gangrene of the intestine. The cysts which were within the wall of the mesentery, contained clear, serous fluid.

CASE VI. *Prolapse of Bowel through Rupture in Mesentery; Symptoms of Hemorrhage and Bowel Obstruction; Operation; Recovery.*—This patient, a white male, was thirty-two years of age, a telegraph operator, well developed and in good physical condition, while intoxicated, was struck by an automobile and rendered unconscious.

Regaining consciousness, he came to the hospital as a "walker," and upon examination was found to have sustained a fracture at the upper third of the right arm, and abrasions and contusions about the legs, hip and trunk. At this time, there was no evidence of internal injuries. When admitted to the hospital at 3.50 A. M., his record was, pulse 100, respiration 24, temperature 98.8° F. On the following afternoon the record was, pulse 84, respiration 24, temperature 101° F. He complained of abdominal pain and was unable to urinate. A laxative enema was given without result. Blood examination showed 15,300 leukocytes. The abdomen became distended and tympanitic and hot stupes were applied but without effect. The recti muscles were slightly rigid and there was dullness in either flank. The patient complained of intestinal cramps and he vomited fluid containing undigested food. At 7 P. M. his pulse was 118, respiration 24, temperature 100° F., and believing that he was suffering from internal hemorrhage or intestinal injury, he was prepared for operation.

Operation.—Incision was made along the right rectus muscle about the level of the umbilicus. The abdomen contained a considerable quantity of blood which came from either flank. The spleen and liver were carefully examined and no injury was found. The intestines in the region of the cecum were fixed. In a systematic way, the search for injury of the intestines was made, beginning at the ligament of Treitz. The mesentery was bruised in several places, and at one portion, there was a large rent extending from the root of the mesentery to the border of the intestine. This rent in the mesentery permitted a loop of bowel to be prolapsed through it, and in this way the obstruction of the bowel was caused. There was active bleeding from the root of the mesentery and after the obstruction was relieved, the bleeding vessels were ligated and the rent in the mesentery repaired. No further injury to viscera having been found, through a suprapubic opening a glass drainage tube was placed in the pelvis, and the wound closed in layers. The convalescence was uneventful, the patient making a good recovery.

CASE VII.—*Obstruction of Bowel by Prolapse of Loop of Intestine through Adherent Omentum; Operation, Constriction Relieved; Recovery.*—The patient was a white female, aged 40, and previous to present attack of illness, had been in good general health. She had two children but no miscarriages. Several months before entering the hospital, while lifting a heavy object, she felt something give way, but no further trouble was experienced except for a "dragging down" pain. She was also troubled with constipation. The

patient stated that previous to coming to the hospital, the bowels had not moved for six days in spite of vigorous catharsis. For the past four days she had been vomiting material which was fecal in character. She experienced a drawing which felt as if the bowels were tied in a knot. She could not retain anything on her stomach and grew weaker and weaker. When she entered the hospital the pulse was weak and rapid, her facial expression was bad, she was very weak, but the temperature was not elevated. The abdomen was not distended, and there was pain on pressure in the epigastrium. She was immediately prepared for operation, the stomach was washed, and hypodermoclysis given and arrangements made for a quick operation.

Operation.—Median incision was made below the umbilicus. The intestine was found collapsed and the omentum was adherent to the pelvic organs. The trouble did not appear to be in the large bowel and a systematic search for the obstruction was made beginning at the ligament of Treitz. About 18 inches from the ligament, there was a band of omentum which produced a constriction and complete obstruction of the jejunum. The loop of bowel had passed through the omentum, the constricting bands being produced by the adhesions at the margin of the omentum to the pelvic organs. A necrosis of bowel had resulted at the site of constriction, the area being covered over with Lembert stitches and reinforced with mattress sutures. The wound was closed without drainage and the patient put to bed in a critical condition.

The patient rallied from the operation and did well until the eighth day when there were two profuse hemorrhages from the bowel. The blood examination showed 9400 leukocytes, hemoglobin estimate, 35 per cent., and Widal's test, negative. The urine analysis showed a trace of albumin and granular and hyaline casts. There was another slight hemorrhage on the eleventh day after the operation. Leukocyte count, 10,200. At the time of hemorrhage, the pulse became accelerated and weak, and the patient grew very weak, but with careful nursing she gradually regained her strength. The abdominal wound healed by first intention, but it is probable that the necrotic area of the bowel broke down causing hemorrhage into the intestine. She left the hospital entirely recovered.

CASE VIII. *Obstruction Due to Excessive Gaseous Distention in the Presence of Angulation.*—The patient, a middle-aged unmarried woman, gave a history of constipation, and when seen in consultation it was learned that the bowels, in spite of the use of cathartics and enemas, had not moved for five days. The patient was nauseated;

there was great pain in the upper abdomen and the abdomen was distended and tympanitic. Rectal and vaginal examination was negative. The pulse was of good quality, the temperature was normal, but the patient was growing weaker and the pain was becoming more intense. Operation for obstruction of the bowel was advised.

Operation.—An incision was made along the right rectus muscle above the level of the umbilicus. The ascending and transverse colon were immensely distended with gas, and the colon was 5 to 6 inches in diameter. The descending colon was not distended and the small intestines were collapsed. There was a ptosis of the transverse colon which descended nearly to the pelvic brim.

The colon was kinked at the hepatic and at the splenic flexure, and it was impossible to force the gas into the descending colon. Jackson's membrane covered the ascending colon, and this part of the bowel was constricted in two places. A careful search for the cause of obstruction was made and it was ascertained that the source of the trouble was at the splenic and hepatic flexures. Gas having accumulated in the large bowel, the transverse colon, which hung low like a hammock, formed an obstruction at either point of suspension. The greater the distention, the more complete was the obstruction. A large trocar was inserted into the distended bowel, and the gas and fluid fecal contents allowed to escape.

The opening in the bowel was closed with a purse-string suture. The abdominal wound was closed in layers without drainage, and the patient put to bed in a comparatively good condition. The patient had received great relief from the operation, but a violent streptococcus peritonitis set in which carried the patient off in the third day.

CASE IX. *Thrombosis of the Superior Mesenteric Artery causing Symptoms of Bowel Obstruction.*—The patient, a widow, fifty-two years of age, was a cook by occupation. There was nothing unusual in her habits of life, and her family history was negative. The menopause occurred in her thirty-eighth year, and she stated that she had been troubled with a diarrhea (three to five movements a day), and that there was pain in the back and rectum (tenesmus) when the bowels moved. The stools were watery and yellowish in color, but at no time had she noticed any blood. More recently the appetite was poor, and two weeks before coming to the hospital, she had pain in the abdomen, vomiting, and she grew weaker and felt exhausted. She had had neither chill nor fever.

On admission to the hospital the patient was in considerable distress, complaining of a diarrhea and an abdominal pain which extended from side to side at the level of the umbilicus. She had

vomited once. The pulse was 100, respiration 30, and temperature 99.4° F. At this time a provisional diagnosis of dysentery was made, and the patient was allowed to get up. On the second day the morning record was pulse 96, respiration 20, temperature 98.6° and the afternoon record, pulse 100, respiration 52, rectal temperature 100° F. Examination of the heart and lungs had been negative. The abdomen was not distended, and percussion, while painful, was not unbearable. Early in the morning of the third day, the pulse rate increased to 120, respirations were 44, and the temperature 100.4° F. The bowels did not move for three days, although there was frequent desire, and an alum enema was administered which was returned with a "coffee-ground" evacuation, giving evidence of hemorrhage high up in the intestinal tract.

The abdomen was now distended, painful on pressure, asymmetrical with bulging on the right side, and tympanitic except on the right side low down, where the percussion tone was flat. The liver dullness was not obliterated. On vaginal examination, which was without much pain, the uterus was found fixed and there was evidence of a chronic endometritis. The pulse was rapid and weak, but the facial expression was good. The breath had a peculiar sweetish odor which is sometimes noticed in fatal cases of peritonitis. The urinalysis gave a trace of albumin, and the blood examination showed 31,000 leukocytes. The patient had a right femoral hernia, which was the size of an egg, but it was easily reducible, and strangulation of bowel was considered improbable. An exploratory operation was thought advisable, although the patient was now in a critical condition.

Operation.—The operation was performed by Dr. J. Y. Brown, myself assisting, and was exploratory in nature. The incision was in the region of the femoral hernia, the sac was opened up, but no obstruction was found in this region. The abdominal cavity contained a considerable quantity of a dark colored serous fluid, and the condition of the patient prohibiting further exploration, the abdominal cavity was merely drained. The patient died a few hours after the operation.

At autopsy the intestines were found to be distended with gas and were mostly reddish brown in color. One area involving about 5 feet of intestine, was greenish in color showing gangrene. The appendix was normal. The liver showed central atrophy. The spleen was hard and showed an interstitial splenitis. The uterus was bound to the adnexa by old adhesions. The kidneys showed a chronic diffuse nephritis. There was evidence of an old pleurisy,

but the lungs and heart were normal. The branches of the superior mesenteric artery and veins showed thrombosis.

The etiology of the thrombosed condition was not clear; however, it may be explained by a preexisting arteritis, or perhaps by injury to mesentery or intestine resulting from reduction of contents of the hernial sac.

There are many factors which must be considered regarding the cause of intestinal obstruction, and the previous history may help in determining the cause. In paralytic ileus, sepsis through its influences on Auerbach's plexus is a frequent cause, especially after operation. Sometimes injury to ribs through reflex action causes paralytic ileus; among the other causes are tumor, strictures, infiltration, and thrombosis of mesenteric vessels. The mechanical obstructions may be various and are frequently caused by adhesions, prolapse of intestines into fossæ and cavities, intussusception, kinks of the bowel with impaction, obturations due to foreign masses, to impacted feces and to gall-stones, compression or incarceration due to tumors, by twists of the intestines or volvulus, and indeed by any means which may lessen or obliterate the lumen of the intestine.

Under normal conditions, the contents of the stomach is discharged into the intestine and is propelled toward the rectum. However, under certain conditions of bowel involvement, as in obstruction or perhaps also under other conditions, peristalsis is reversed and the intestinal contents is discharged into the stomach. Numerous experiments and observations have been made to prove that reverse peristalsis may take place, and this fact may help to explain the formation of certain cases of intussusception. I have observed as others have, that in some cases of intussusception, the distal portion of bowel ascends or creeps over the proximal portion. Another cause of obstruction which I have observed and which has not been sufficiently emphasized, may be attributed to the accumulation of gas in the bowel and thereby to cause overdistention and consequent obstruction when kinks are present or even when the normal flexures are involved. This is particularly true in cases of sagging of the transverse colon which, when distended with gas, may by kinking at the hepatic and splenic flexures, produce absolute obstruction with all of the distressing symptoms. Such a condition was found in Case VIII, and I am acquainted with similar cases in the experience of others.

From a review of the cases reported an idea of the symptoms may be had. Naturally the symptoms will vary somewhat with the nature of the obstruction. In the latter stages of obstruction the symp-

toms of the various obstructions are nearly identical, while the initial symptoms may be grouped in two classes, the one in which the obstruction is gradually produced, the other in which the obstruction takes place more or less suddenly.

Where the obstruction is gradually produced, there is usually a history of constipation, straining, gas in the intestines, and increased peristalsis of a remittent type accompanied by griping or discomfort rather than by acute pain. When the obstruction is complete or acute, there is usually more or less sudden and violent pain in the intestine, at first perhaps diffuse, but later usually localized at the site of obstruction. The pain is remittent and accompanied or preceded by peristalsis which may frequently be felt through the abdominal wall or seen on the surface. With the stethoscope the gurgling of gas in the intestine may be heard and this helps to distinguish mechanical ileus from paralytic ileus. The temperature, respirations and pulse at first are little, if at all, influenced. As the condition progresses, nausea and vomiting ensue, the vomitus finally becoming fecal in character. The bowels move slightly or not at all and flatus is not expelled. Cathartics tend rather to aggravate the condition. In intussusception, there is frequently blood and mucus passed per rectum. The temperature is usually not elevated, and, unless peritonitis or other complications set in, often becomes subnormal. The respiration is usually uninfluenced except in extreme conditions, when it is gasping. The pulse becomes more rapid, weak and thready. The skin becomes cold and clammy, the patient becomes restless and looks sick.

The diagnosis is important and efforts should be made to determine whether the obstruction is of the paralytic or mechanical type and, if possible, to determine the nature of the obstruction. With obstruction, there is usually a lack of bowel movement, and in the paralytic type, there is distention of bowel, lack of peristalsis and, therefore, no gurgling of gas in the intestine. Sepsis, injury to or involvement of mesenteric or spinal nerves, or reflex nervous influence, may be the cause of paralytic ileus, and should be given careful consideration in the diagnosis. With a history of constipation, the presence of acute abdominal pain, cramp-like in character, and a tendency to localization of pain which is accompanied or preceded by intestinal peristalsis, there exist symptoms which are very significant of an early obstruction. Especially is this true if the abdomen is but little distended and the temperature, pulse and respirations are normal, and the patient has not eaten anything to cause intestinal disturbances. If nausea and vomiting ensue, the

diagnosis becomes more evident. These early symptoms are often present when the obstruction is caused by postoperative adhesions, kinks in the bowel caused by adhesions, tumors of the intestines, volvulus, intussusception, strangulations, etc. In gall-stone obstruction, there may be a history of gall-bladder disease, and the acute obstruction may be preceded by repeated milder forms of obstruction due to passage of the stone and by shifting of abdominal pain. In intussusception there is usually blood and mucus in the stool, and a tumor mass may usually be felt. Blood in the stools may also be found in ileus due to thrombosis of mesenteric vessels. In volvulus and in intussusception, there may be asymmetry of the abdomen.

As the symptoms of obstruction advance, the vomitus becomes fecal in character, the pulse rapid and weak, the facial expression pinched, the skin takes on an ashen hue and becomes cold and clammy; the tongue becomes coated and dry, and the patient gets thirsty and restless. Depending upon the location of the obstruction, the abdomen will remain flat or distended. If the obstruction is low down, it may sometimes be detected by rectal examination.

Although some forms of intestinal obstruction are relieved by medical means, the condition is essentially surgical and the sooner physicians and the laity recognize this fact, the better will be the opportunity of curing these cases. Most patients with intestinal obstruction who die, are lost because they reach the surgeon too late. Perhaps the chief reasons for this lies in the fact that the condition of obstruction is often not recognized by the physician as well as by the patient, until terminal symptoms present themselves. Fecal vomiting and collapse are terminal symptoms, and patients with such symptoms offer little hope for recovery because the vital centers have already been involved and, therefore, relief of the obstruction may benefit the patient but little. Those patients that are operated on in the early stage of obstruction before systemic changes have taken place, almost uniformly recover. The retention of fecal material in the intestines in the presence of obstruction, acts as a powerful poison, and the sooner the poisonous material is permitted to escape from this system, the better the opportunity for a cure. Better still are the chances for the patient when the obstruction is relieved before these toxic elements have had an opportunity to form. It behooves us, therefore, to operate when the first symptoms of obstruction present themselves, if we wish to improve our results in this class of cases.

The need of early operation is emphasized by the fact that in the early operations, the patients almost uniformly recover, while in

the late operations, the mortality rate is high. If it is rational to operate early in appendicitis, the argument should maintain with greater force in intestinal obstruction. In the early operation, we have the reserve forces of the patient on our side; in the late operation the vital forces are at lowest ebb.

A great deal has been written about the treatment of intestinal obstruction, but the simpler the technic, the better will the results be. Above all, it should be the aim to look after the patient as well as the condition from which he is suffering. Therefore, one should do those things, that will preserve the patient's strength, as well as to look after the surgical feature of the case. In the early conditions, the methods which apply to the usual cases submitted to laparotomy may be used.

In the late cases, the stomach should be washed before operation and appropriate stimulation instituted. The operation should be short, so that little anesthetic need be used and the shock of operation lessened. In the early cases where the bowel and bowel contents are nearly normal, resection of intestine may be resorted to, if indicated. In the critical stages, it is safer not to resect but to perform enterostomy. Since the unfavorable results are dependent upon infection and on retention of fecal material, it is well, before opening the bowel, to suture it in the abdominal wound, so that the peritoneal cavity may be protected against infection. However, in certain cases it may be advisable to relieve the distended bowel of gas and fecal material by the passage of a tube and thus to lessen the toxemia. The cause of obstruction with the involved area of bowel may be brought outside the abdominal cavity, clamped and removed, or, if the urgency of the case demands it, may be left outside the abdominal cavity and removed later.

After the patient has regained strength, the fecal fistula should be repaired and the continuity of the bowel reestablished by the most appropriate means.

In the selected cases, primary resection, when indicated, gives the best result. In the critical cases, it is safer to resort to enterostomy and at a subsequent operation to repair the fecal fistula. The limits of the paper will not permit of details in the technic of operation.

CONCLUSIONS.

Obstruction of the bowel is essentially a surgical condition and the mortality rate is increased in direct proportion to the duration of the obstruction.

Greater stress should be laid on the necessity for early operation in cases presenting symptoms of bowel obstruction.

In strangulated hernia, where symptoms of bowel obstruction are present, the cases come earlier for relief, and the pathology being in a great measure external to the abdominal cavity, resection of bowel is a safer procedure than in other obstructions.

In the early cases of obstruction, resection may be a safe procedure. In the critical cases, primary enterostomy and later resection of bowel or repair of fecal fistula is the better course to pursue.

STENOSIS OF THE PYLORUS IN INFANCY WITH REPORT OF CASES.

BY

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I WISH to place on record a number of cases operated upon for stenosis of the pylorus in infants by myself and colleagues by pyloroplasty and to call your attention to the procedure as being more desirable for the relief of this condition than that of gastroenterostomy. I here add six cases to the two reported to this Association last year—Cases III, IV, V, VI, VII, and VIII.

Stenosis of the pylorus found in infancy is due to a hyperplasia of the circular muscular fibers of the pylorus and to a slight degree the involvement of the longitudinal fibers. This mass of muscle, which feels at times almost as hard as soft cartilage, throws the mucous lining of the pylorus into longitudinal folds and the mucous membrane being also swollen we have produced a narrowing or complete obstruction of the lumen of the pylorus. This condition of the pylorus is permanent, as shown by autopsy months following a gastroenterostomy. The pyloric tumor was found the same as at the time of operation.

Dr. Dodd has made numerous skiagraphs following the ingestion of bismuth by patients who had been operated upon for stenosis of the pylorus by a gastroenterostomy. He found that no bismuth passed the pylorus in any of the cases examined, thus showing that the original cause of the obstruction persisted.

We cannot too frequently lay stress on the symptoms and signs that enable us to diagnosticate this condition, because when an early diagnosis is made one can at once resort to surgery with a better chance for success. The high mortality is due in a great measure to delayed operation.

The disease usually is found in male infants who have been breast fed and are healthy in appearance. From one to five weeks after birth it is noticed that he regurgitates the milk after feeding and later rejects about all the food taken. The vomiting may occur immediately after nursing or be delayed for one-half hour or more. At times, the fluid taken may be retained for two or more feedings, and then the quantity taken at all the feedings is vomited. The child

may vomit but once or twice in twenty-four hours. The food is expelled suddenly and with considerable force from 1 to 6 or 7 feet. This propulsile or projectile vomiting is characteristic of obstruction. We note the forcible character of the vomiting and also that the vomitus may come through the nose as well as the mouth. The bowels are constipated and the movements are usually green, unhealthy and slimy. Changing the diet does not arrest, for any length of time, the loss in weight which soon becomes alarming.

The abdomen is distended in the epigastric, and contracted in the lower abdominal, region. The abdomen should be examined immediately after the infant has been fed for visible peristalsis of the stomach. The peristaltic wave is seen passing transversely from left to right and terminating in the right hypochondrium. Deep palpation, just outside the nipple line and about one-third the distance from the umbilical level to the costal margin, reveals a hard olive-shaped mass, 3/4 inch long by 1/2 inch wide, in the majority of cases.

While a pyloric tumor may be palpated in most of the cases, it may be so covered by the liver that it would be impossible to detect it. I have noted a case where three physicians thought that they could feel the tumor, yet on opening the abdomen they were in error, as it was tucked away under the liver and could not have been felt. We all realize how readily we may be mistaken if we have some preconceived idea as to what we should feel during an abdominal examination. I believe that we should not lay too much stress upon our ability to demonstrate by palpation previous to operation the presence of a pyloric tumor. Should the other signs and symptoms be marked, we should not hesitate to operate.

The *x*-ray may give us valuable aid by showing us that a solution of bismuth does not pass beyond the stomach. It is, therefore, desirable that we employ the *x*-ray to assist us in determining the presence of obstruction of the pylorus.

The characteristic symptoms are: vomiting in a healthy breast-fed infant, usually a boy; later vomiting propulsile in character; loss of weight; constipation; prominent epigastric region; visible peristalsis of the stomach; palpable pyloric tumor.

The medical treatment consists of washing the stomach twice a day with a solution of bicarbonate of soda, grain one, to 1 ounce of sterile water. Rectal injections of 1/2 pint of normal salt solution three times a day. Small quantities by mouth of hot water, modified milk, peptonized milk, meat juice or albumin water. Feeding through the nose, by the aid of a small rubber catheter, with water, ounces 2; barley water, ounce 1, may be of value.

The operative procedure that I advocate consists in making a vertical right rectus incision into the abdominal cavity thus exposing the pyloric tumor. An opening 1/2 inch long is then made through the wall of the stomach about an inch from the pylorus. Through this opening a small-sized sound or probe is passed into the lumen of the pylorus and retained there. The serous and muscular coats forming the pyloric tumor are divided with a knife down to the mucosa. This incision is parallel to the long axis of the bowel. The hypertrophied muscle on either side of the incision is now separated from the mucosa laterally over half the circumference of the pylorus and a small portion of the muscle removed, which allows an accurate transverse approximation of the wound. This procedure permits the subsequent easy passage of larger sized sounds until the lumen of the pylorus is sufficiently patulous, and by this method the longitudinal folds of the mucosa are smoothed out without injury. The longitudinal incision through the serous and muscular coats of the pylorus is now closed with interrupted Lembert sutures of linen, so that the line of union is at a right angle to the long axis of the bowel. The result is that the pylorus is wider at this point than it was before the operation.

The wound in the stomach is closed with two rows of sutures. The abdomen is closed in the usual way, approximating the peritoneum, muscles and skin.

Gastroenterostomy is attended with a high rate of mortality, about 50 per cent. save in the hands of expert surgeons. Deaths have occurred from intestinal obstruction several weeks following the immediate effects of the operation. Jejunal ulcers may form at the site of the stoma giving rise to serious trouble.

The operation by pyloroplasty may be performed with success by a surgeon of average skill. The first patients operated upon by myself and colleagues all recovered. The operation may be performed more rapidly and with less trauma to the tissues and consequently less shock to the patient than the operation of gastroenterostomy. We directly remedy the defect at the site of the obstruction and leave the parts more nearly as nature intended that they should be.

I believe that the operation of pyloroplasty or pyloroplasty combined with the passage of smooth sounds through an opening in the stomach and the lumen of the pylorus will ultimately be the operation of choice.

Case of Stenosis of the Pylorus; Pyloroplasty; Death; Dilation of the Pylorus by a Sound passed through an Opening made in the Stomach.

—S. F., boy, nine weeks old, entered the Rhode Island Hospital June 18, 1908. He weighed at birth 12 pounds. The baby was fed on both breasts for ten days, when the left breast became inflamed and an abscess developed. He nursed the inflamed breast for three weeks. During the last three days of nursing he vomited each feeding and was given modified milk and the normal breast. He vomited most of the feedings during the next three weeks. Bowels constipated and stools green in color.

Admitted to medical service; diagnosis of pyloric obstruction was made and operation advised. Parents took patient home June 19.

Readmitted June 24 to the surgical service. Baby pale, poorly nourished. Stomach distended after feeding; abdomen slightly flattened. Marked gastric peristalsis readily noticed. No tumor mass felt. During the child's stay in the hospital he vomited most of the food taken.

Operation, June 26, 1908, by Dr. Keefe. Pyloroplasty.

Dilation of the pylorus through the wound made in the stomach. A two-inch incision was made through the abdominal wall just below the ensiform cartilage and between the recti muscles. The pylorus was found greatly thickened, hard and of an almost cartilaginous nature. The stomach was slightly distended. An incision was made in the stomach near the pylorus ar d a small sound was passed through the constricted pyloric opening. A longitudinal incision was now made through the pyloric tumor down to the mucosa. Large sounds were then passed through the opening in the stomach and into the pylorus. The wound in the pylorus was closed in a transverse direction to its long axis. The stomach and abdominal wounds were then closed.

The patient was in fair condition at the close of the operation; during the night he became very restless, gradually grew weaker and died toward morning.

Case of Stenosis of the Pylorus. Pyloroplasty. Recovery. Dilation of Pyloric Canal through Wound in the Stomach.—H. J. D., a healthy vigorous child, born December 23, 1912; weight at birth 8 pounds and 13 ounces. Breast fed; mother had an abundance of milk. The baby lost 10 ounces the first three days, then gradually gained in weight to January 20, 1913, when the baby began to vomit all fluids taken into the stomach. As a rule, the stomach emptied itself directly after the child was fed, but at times half an hour or even two hours would elapse before the vomiting occurred. Upon taking nourishment the child appeared uncomfortable and distressed,

but as soon as he vomited he seemed relieved and would usually go to sleep.

The first four days that the baby vomited, the vomitus was only occasionally projectile in character, but later it became entirely so. The vomitus contained milk mixed with mucus and was curdled, not soured. On January 28 peristaltic waves were discernible over the abdomen. Various medical measures were adopted in an effort to control vomiting; changes were made in the preparation, quantity and character of food and period of feeding. Saline drips and nutritive enemata were given, but with very little success. The baby's weight gradually decreased until January 31, the day of the operation, when he weighed 9 pounds and 2 ounces.

I was called to see the case by Dr. DeWolf on January 27. A diagnosis of stenosis of the pylorus was made and surgical treatment recommended if improvement did not take place. January 31 Dr. Morse, of Boston, was called in consultation and advised operation.

Operation. Pyloroplasty. Dr. Keefe, January 31, 1913. Dilatation of the pylorus through a wound made in stomach.

A high incision, about 1 1/2 inches long, a little to the right of the midline, was made through the abdominal wall. The pylorus was exposed. Examination showed a firm, resistant, pink-colored tumor at the pylorus the size of a small olive. A small incision was made through the wall of the stomach about 1 inch from the pylorus. Through this opening a small-sized steel sound was gently passed into the pyloric canal and held there. The serous and muscular coats of the pyloric tumor were divided down to the mucosa. The sound was removed from the pyloric canal and a larger sized smooth metal sound was introduced without the least difficulty. On either side of the incision for about a quarter of an inch a wedge-shaped piece of pyloric tumor was carefully dissected from the mucosa and peritoneum and removed. The edges of the incision were united so that the line of union was transverse to the long axis of the bowel. Interrupted and Lembert sutures of fine linen thread on a straight intestinal needle were used. The wound in the wall of the stomach was closed with double rows of the same material. The abdomen was closed with sutures of chromic catgut and the skin approximated with linen thread.

Directly following the operation the child was in shock. It was necessary to resort to stimulation and strychnia in minute dose; brandy was also given. The baby responded bravely and soon showed a decided improvement; later morphine in minute doses was given, as directed, for pain. Drip salines were continued. Eighteen

hours after operation the mother's milk, diluted with lime water, was given by a medicine dropper. Fifty hours after operation there was no more vomiting, although occasionally food would regurgitate. On the fifth day the baby was given the mother's breast and nourishment was retained.

The cutaneous stitches were removed on the eighth day; the wound healed nicely. The baby gradually gained in weight. Two weeks after the operation he had gained 14 ounces. There has been a steady general improvement and the baby appears to-day to be a normal and healthy child.

Case of Stenosis of the Pylorus. Pyloroplasty. Recovery.—R. G., boy, four weeks old, admitted to the Rhode Island Hospital under the care of Dr. E. B. Smith, April 18, 1913.

A normal breast-fed baby; weight at birth 9 1/4 pounds. During the first two weeks the mother noticed that the child regurgitated a part of each feeding. Since then the child vomited after each feeding. The baby is apparently hungry and greedy for food. Bowels constipated; have not moved for two days. Enemas given. The movements are small in amount, very dark brown in color and have lumps in them. Baby well developed, but poorly nourished. Visible peristalsis. Tumor palpable.

Operation, April 23, 1913, by Dr. E. B. Smith. High mid-rectus incision. Pylorus found thickened and firm, and as large as a medium-sized olive. A longitudinal incision was made through the pylorus into its lumen. This opening was brought together in the opposite direction with silk sutures. The abdominal wound was closed in layers.

May 6. The baby was discharged from the hospital improved.

September 8. The baby has remained well to date.

Case of Stenosis of the Pylorus. Pyloroplasty. Death. Sounds passed through an Opening made in the Stomach and into the Lumen of the Pylorus.—R. F., boy, born April 21, 1913, now one month old, under the care of Dr. Jordan. A healthy breast-fed baby.

A brother was operated upon for the same trouble five years ago at the Rhode Island Hospital.

Adenoids were removed when the baby was one week old. When three weeks old he began to vomit. During the past four days the vomiting has been of the projectile type. Bowels constipated. The removal of the stomach contents several hours after feeding showed a few ounces of milk. Although the food has been changed a number of times, the child is losing weight and becoming weaker.

He is well developed, but poorly nourished. The epigastric region

is distended and the lower abdomen flattened. Peristaltic waves may be seen passing from left to right in the epigastric region following the ingestion of food. No tumor palpable.

Operation. Pyloroplasty. Dr. Keefe, May 21, 1913.

Epigastric right rectus incision. Definite tumor of the pylorus found, of a firm cartilaginous consistency. A small sound was passed through an opening made in the stomach and through the pyloric orifice. The wound in the pylorus was brought together in an opposite direction with Pagenstecher interrupted sutures. The incision in the stomach and the abdominal wound were closed.

The child rallied fairly well from the shock of the operation, but died the next morning.

Case of Stenosis of the Pylorus. Pyloroplasty. Recovery. Pylorus dilated through the Wound made in the Stomach.—V. K., girl, seven weeks old, entered the Rhode Island Hospital July 7, 1913, under the care of Dr. Kingman. Seen in consultation by Dr. Keefe.

The baby for several weeks after birth was fed on a variety of foods and modifications of milk without being able to check the vomiting. At times, three or four feedings were retained, then vomited the entire amount. The mother said "the vomiting was shot across the room at times." Bowels moved frequently, but stools have been small and dark green in color. Loss of weight.

There is visible peristalsis over the stomach following the ingestion of food. Vomiting projectile. Palpation of a pyloric tumor doubtful.

Operation. Pyloroplasty. Dr. Kingman, July 7, 1913. Sounds passed through an opening made in the stomach.

An incision was made in the right upper quadrant and the stomach and the pylorus were brought into view. The pyloric ring felt hard, but not greatly enlarged. The pyloric lumen was smaller than normal. An opening was made in the anterior wall of the stomach near the pylorus. An incision was then made through the pylorus in a longitudinal direction through the mucous membrane. Graduated Hank's dilators were passed through the opening in the stomach and the lumen of the pylorus. The wound in the pylorus was closed transversely, thus widening the lumen of the pylorus at this point. The abdominal wound was closed with chromic and silkworm gut. Good recovery from the operation.

Discharged from the hospital July 23, improved.

September 5. Baby continues to improve.

Case of Stenosis of the Pylorus. Pyloroplasty. Recovery.—M. R., girl. Entered the Rhode Island Hospital August 7, 1913, under the

care of Dr. Mattison. She is now seven weeks old and was a healthy breast-fed baby. Her weight at the fifth week was 9 1/2 pounds. During the last two weeks she has vomited a great deal. Regurgitations of milk occurred occasionally after feeding and was the first symptom noticed. Now most of the milk taken at a feeding is rejected. The bowels are constipated, two or three days elapsed without a movement. The feces were green in color and the odor foul.

She is a well-developed and fairly well-nourished infant. Pyloric tumor palpable. Visible peristalsis.

August 11. The baby continues to vomit. The movements are small, green and foul. She has lost 10 ounces during the last four days.

Operation. Pyloroplasty. Dr. Mattison, August 12, 1913.

A high right-rectus incision was made. The stomach and pylorus were drawn into the wound. There was a tumor of the pylorus as large as the end of one's thumb. A longitudinal incision was made through the tumor mass down to the mucosa. A V-shaped piece of the tumor tissue was removed from each side of the incision. The incision was then closed in the opposite direction. The abdominal wound was united in layers.

August 14. Vomits less. Child was being carefully fed at hospital, but parents thought the baby was being starved and they took the child home the twenty-second day after operation against advice. Child then went rapidly down and parents again brought her to the hospital after a week. Child was admitted the second time in poor condition with a gastroenteritis and died in two days.

Specimen shown.

Case of Stenosis of the Pylorus. Pathological Specimen.—I wish to pass about a pathological specimen sent me by Dr. Utter. It was removed postmortem from a girl eight weeks old, with the following history.

The babe was constipated and vomited for past six weeks. She was a full-term infant weighing 10 pounds. Breast-fed for five weeks, then prepared foods and modified milk were given. Feedings usually vomited immediately, rarely, one hour after taking. The symptoms subsided for a day or two after each change of feeding, only to recommence. Constipated since birth; an occasional hard green stool following an enema. Losing weight rapidly; drowsy for two days. Present weight 5 pounds and 11 ounces. Extremely emaciated. The skin dry, hung in folds on the extremities; she was the picture of complete dehydration. The abdomen was gener-

ally distended. A small tumor was felt in the right upper quadrant; visible peristalsis was marked and the stomach extended below the umbilicus.

Stomach contents showed 3 3/4 ounces of dark green sour material.

Operation by Dr. W. A. Downes of New York, five hours after admission to the Hospital. Gastroenterostomy. Died thirty-six hours afterward. She was a poor surgical risk and emphasizes the advice to operate early.

FIBROMA CARDIA IN A GIRL OF EIGHTEEN. GASTROSTOMY AND ENUCLEATION.

BY
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New York City.

MISS W., æt eighteen, was seen by me in consultation with Dr. H., her family physician, at the age of fourteen some four years ago. When I saw her she presented the appearance of an almost exsanguinated child, and gave through her parents and Dr. H. the following history:

On one occasion some months before (having been a perfectly well child up until that time) she vomited without any previous pain, etc. This day, the day of my consultation, while in school she suddenly became nauseated and vomited a large quantity of blood, without pain at any time. Several attacks of vomiting followed in her home, the quantities estimated at fully a pint of almost pure clot and liquid blood at each vomitus.

Examinations of the chest, etc., were negative. The diagnosis by exclusion was ulcer of the stomach or varicosities. Morphia and rest were followed by absolute cure and repair in a few days.

Eighteen months later she had another severe attack of like nature, and at this time she developed jaundice, but had had no pain, and no temperature. A rapid recovery again took place.

October, 1912, about eighteen months again, she had another similar attack. With this attack she had a profuse menstrual flow and bleeding gums. This time six weeks were required for her return to normal health.

March 12, 1913, she had her last attack, which was preceded by a sense of uneasiness and flatulence the last week in February.

About the middle of April, 1913, she vomited once, containing no blood or food contents. Her last menstruation occurred about the middle of March. During these attacks, subsequent to the one in 1909, and her periods of quiescence, she was seen by various physicians and one of our gastroenterologists. The gastroenterologist, without taking any stomach contents or having any test breakfasts, for reasons of his own and that the girl rebelled against such procedure, made a tentative diagnosis of ulcer. During this same lapse of four years, she had been upon a restricted diet, *i.e.*, chiefly liquids and softs.

The *x*-ray was called in for help and after various exposures with bismuth, etc., it was stated positively by the radiographer that an ulcer of the pylorus existed, owing to the fact that the bubble of air characteristic of ulcer was evidenced at the pylorus. Personally, I was not satisfied with the radiograph and stated very strongly my lack of confidence in the reading of the plates as given by the radiographer. I saw her at the age of eighteen May 5, 1913, the second time in four years, and obtained the preceding history of her hemorrhages and the records of her *x*-ray plates. In addition, Dr. H., her parents and herself stated that all attacks began with nausea, syncope, no fever and no premonitions. The last attack followed a hearty meal.

Pain.—Has had some when she suffers from gas; pain is in the right half of the epigastric and the right hypochondriac regions, and radiates to the shoulder space. I am inclined to believe her statements in reference to pain were due to the apparent importance placed upon this factor by the various physicians examining her, all evidently seeking for pain in the costovertebral angle, the shoulder blade and the epigastric and hypochondriac zones. The pains she complained of were not relieved by food intake.

Palpation evinced a tender area over the gall-bladder and also over the appendix. It was finally concluded by all of us that an exploration of the abdomen be made. This was done by me on the twelfth day of May, 1913, with most unexpected findings.

Upon exposing the contents of the upper abdomen, the gall-bladder, etc., were found free from adhesions. No evidences of recent or old ulcer of the pylorus or stomach. The pylorus readily admitted a finger. Palpating the stomach in the cardiac portion, the examining hand came in contact with a tumor the size of a small egg, and felt as though it was at the cardia. More painstaking examination showed this to be so. The index- and ring fingers of the left hand were slipped around the cardia with the stomach below and the diaphragm above the hand; the thumb then pushing down readily outlined the position and size of the growth. This growth was now taken to be, in all probability, a large indurated ulcer of this region. Malignancy was not considered a factor of weight, owing to the duration of this disease, yet feeling that an error might be more than possible, I did a gastrostomy, retaining my exploring hand still in the above-described position. As soon as the gastrostomy wound was drawn apart, and the stomach wiped dry, it was seen that a tumor presented at the cardia. This tumor so resembled

a large prostate, that I was led to speak of it as prostate in the stomach.

A stomach tube was passed by the anesthetist and passed into the stomach just as the catheter does in a prostate, *i.e.*, the growth surrounded the cardia to within 1/6 or 1/5 of its circumference, stood up as a large two-lobed prostate. At one spot there was an abrasion of mucous membrane and the mass appeared white and glistening in this area. I then pushed the growth strongly into the cavity of the stomach by means of the fingers about the cardiac orifice, and with a blunt scissors tore through the mucous membrane and was able to enucleate the growth with greater ease than one does the prostate. Two small vessels were ligated, the gastrostomy wound sutured, after a careful, but negative, ocular and digital inspection of the mucous membrane had been made.

The abdomen was closed with a small drain. The stomach tube was left in as I felt that the torn mucous membrane might act as an obstruction flap to feeding. This was a fallacious tenet, as the tube was ejected during recovery from narcosis, and the swallowing of liquids the following day was accomplished without pain or difficulty.

A speedy recovery was made, the patient being removed to her home on or about the tenth day. There have been no further bleedings to date.

This type of tumor of the stomach is exceedingly rare, at least as far as the published records show.

Stengel (*Trans. Pathol. Soc.* Phil. 1893–95–1896, xvii, p. 50) reports: This specimen of fibroma of the stomach was removed on autopsy in a patient in whom gastric symptoms had not been striking. The tumor was on the outer wall, subserous, about the size of a walnut, and firmly attached. He called attention to the absence of muscle fibers, although the tumors in this situation are usually myomata or myofibroma. The tumor appeared to be a pure fibroma.

Spencer, W. G. (Benign tumors, fibroma, myoma, lipoma incapsulated in the wall of the stomach; *Proceedings Royal Soc. Med.* London, 1908–09–11, Surgical Section, p. 311) records the history of a hospital nurse forty-six, who had suffered from abdominal trouble some time, from whom he removed from the posterior wall of the stomach a solid elastic tumor which shelled out easily and without hemorrhage. The growth was the size and shape of a large kidney, and on section was shown to be a dense fibroma.

60 WEST FIFTY-SECOND STREET.

SOME INTERESTING POINTS ON GALL-STONE SURGERY WITH REPORT OF CASES.

BY

JOSEPH H. BRANHAM, M.D.,

Baltimore, Md.

GALL-STONE disease is one of the most common ailments. Nearly 50 per cent. of the people living to be fifty years of age are more or less affected. It is three times more frequent in women than in men, and very rare under twenty years of age, becoming relatively more common in advanced life. Of women who have had this disease, about 90 per cent. have had children. This is difficult of explanation. Badly fitting corsets, relaxed abdominal walls, constipation and overfeeding are probably factors.

"In Japan, in 8406 necropsies, Miyake found gall-stones in 3.05 per cent., less than half as often as in Europe and America. The sexes were about evenly affected. This, he thinks, is because Japanese women do not wear corsets. Cholesterin stones are very uncommon in Japan, which can probably be accounted for by the difference in diet."[1]

This can hardly be the true explanation, as it has been shown by careful experiments that cholesterin is formed from the mucous membrane of the gall-bladder during inflammatory changes; hence, it would appear that gall-bladder catarrh must be less common among Japanese women.

Location.—In nearly all cases the stones originate in the gall-bladder, they migrate frequently to the cystic, the common, or even to the hepatic duct; very rarely are they formed in the ducts.

Production.—The bile is normally sterile, though examination of very large quantities may show an occasional germ; these, however, are nonactive and of no importance. During the chronic inflammatory processes, which are always associated with the formation of gall-stones, bacteria are constantly found. Nearly all the pathogenic varieties have been reported, but the more common are the bacillus of typhoid fever and the colon bacillus. These often remain in the gall-bladder for long periods of time. Bacillus of typhoid fever has been demonstrated in Dr. Welch's laboratory seven years after the

[1] *Archiv für klinisch Chirurgie*, Berlin, April 26, page 1332.

attack. The principal constituents of gall-stones, bilirubin, calcium and cholesterin, are produced from the mucous membrane of the inflamed gall-bladder; interference with the proper drainage of the gall-bladder is one of the essential factors in the etiology of this disease; frequently foreign bodies, or clumps of bacteria, are found to be a nucleus of gall-stone. The following facts may be considered as having been demonstrated by experimental studies:

First.—The injection of virulent cultures of microorganisms cause acute cholecystitis without gall-stone production.

Second.—Introduction of attenuated cultures, or of foreign bodies, produces no effect if the drainage is normal.

Third.—The introduction of nonsterile bodies, or of attenuated cultures of bacteria into a gall-bladder in which the drainage is interfered with, will cause the production of gall-stones.

Bearing on the question of foreign bodies in the gall-bladder, as well as the treatment of this disease, is a most interesting series of experiments by Hansemann. He placed a number of human gall-stones in the bladders of healthy dogs. Later examination showed the stones partly, or completely, dissolved. In no case did they cause trouble.[1]

The following cases are taken from my service at the Franklin Square Hospital of Baltimore during the past two years. I have selected those which seemed to illustrate and emphasize certain points to which I wish to call your attention.

CASE I.—Mrs. L. Z., white, female, aged thirty, married, mother of several children. She had been suffering several weeks with a typical case of typhoid fever. As the patient failed to improve at the usual time, instead becoming weaker and suffering much distress in the liver region, her physician suspected gall-bladder complication and brought her to the Franklin Square Hospital July 12, 1911. Operation July 13, 11.35 A. M. Gall-bladder enormously distended, pale, walls greatly thickened, filled with thick creamy pus containing several medium-sized stones. After excising the gall-bladder, two stones were found in the common duct and were removed through the open cystic duct by compression. This patient made an uneventful recovery.

CASE II.—Miss K., white, female, aged twenty-four, unmarried, admitted May 6, 1913. As this patient's condition was very desperate, operation was done the same afternoon. She had been very ill for more than six weeks when she came under my care. Incision

[1] Die Lösungsmöglichkeit der Gallensteine, v. Hansemann.

showed a gall-bladder gangrenous throughout its entire extent, and filled with gall-stones and pus; around the bladder was an imperfectly walled cavity containing a large quantity of foul pus; the gall-bladder was removed, the cavity cleaned out and freely drained. About a week later a second abscess formed in the lower right abdominal segment; this was also drained; symptoms of partial intestinal obstruction, due to the extensive adhesions present before the operation, were only partially relieved; fecal fistula formed several days after operation. The patient succumbed on June 16, to long-continued suppuration and inanition.

CASE III.—Mrs. Z., white, female, aged twenty-two, mother of two children. She had an umbilical hernia and had suffered with attacks of intestinal obstruction from bowel being caught in same. On the night of May 13, 1913, she was seized with severe pain in the upper abdomen. Her physician, who is a very careful and expert diagnostician, was much puzzled as to the cause of her illness. She had vomiting and symptoms of partial intestinal obstruction with rapid pulse and normal temperature. I saw her on the night of the 14th at her home. At that time her temperature had not been over 99°, pulse about 100 and weak; she had very great tenderness over the upper abdomen with pain; altogether, her condition was distressing and much graver than her pulse and temperature would indicate. She was sent to the hospital on the morning of the 15th and operated on at 1 P. M. Her temperature was 99.4°, pulse 100, when she entered the hospital; no positive diagnosis was made before operation; the question of acute cholecystitis was considered but, after careful questioning, we could get no history of gall-bladder trouble, and as her temperature had been normal with only very slight rise when she was removed from her home to the hospital, less than one degree, its presence was considered very doubtful. Incision revealed a very large gall-bladder filled with pus and stones. Cholecystectomy was followed by rapid convalescence.

CASE IV.—Mrs. D. B., white, female, aged forty-three, married, no children, wife of a physician; had suffered for many years with gall-bladder disease, many of the attacks being very severe and associated with high fever and symptoms of severe inflammation. She had been very ill for more than a week before entering the hospital on August 22, 1912. At this time her pulse and temperature were nearly normal and her inflammatory symptoms had subsided to a great extent, but there was still marked tenderness over the gall-bladder region. Operation August 23, 11.40 A. M. The patient's abdomen was very thick; the gall-bladder was exposed with some

difficulty; it was much enlarged; contained pus and several gall-stones; the walls were greatly thickened and extremely friable, so that dissection was almost impossible; forceps and ligatures would tear through; hemorrhage was controlled with much difficulty on this account. After removing the major part of the viscus, because of severe bleeding it was necessary to clamp the stump with a large pair of forceps and leave them *in situ*. This patient did very well, except that a fistulous opening persisted and, on November 14, 1912, she reentered the hospital and was operated upon at 1.30 P. M. On dilating the fistulous opening a large stone was found. The incision was extended and the whole mass consisted of gall-bladder wall and the beginning of the cystic duct was removed; a drainage tube was tied in and packed around with cigarette drain. She left the hospital November 27; drainage soon stopped and she has remained well since.

CASE V.—W. D., male, white, aged twenty-nine; entered hospital January 2, 1913, discharged February 27, 1913. This patient had suffered with symptoms of gall-bladder obstruction and cholescystitis for the past two years, the attacks occurring about twice a month and continuing for nearly a week, so that he has lost almost half his time from work during this period. The colicky pains in this case have always been extremely severe and long-continued, so that large doses of morphine have been necessary to give relief; his temperature, usually, has been very slightly elevated. Operation January 26 at 8.20 A. M. On opening the abdomen a large, thick and dark gall-bladder made its appearance; palpation failed to reveal stone either in the gall-bladder or in the ducts. A well-marked cicatricial band was found across the first part of the cystic duct; gall-bladder was removed and found to contain a large quantity of thick dark bile mixed with mucus, which was very viscid. From the inside the cystic duct was found to be greatly constricted by the cicatrix. This patient made a normal recovery and remains entirely well.

CASE VI.—Mary C., white, aged sixty-eight, married, mother of several children, entered the hospital January 16, 1913; operation January 18, 1913. The patient was extremely ill with symptoms of acute cholecystitis following long-continued gall-bladder disease. An exploratory incision was made and acute suppurative inflammation of the gall-bladder and surrounding tissues together with extensive malignant infiltration involving the gall-bladder and adjacent parts of the liver, was found. The patient's condition was very alarming under the anesthetic, so that a drain was very rapidly

introduced and she was removed from the operating table. She died on the next day at 9.45 A. M.

CASE VII.—Mrs. J. C., white, female, married, aged sixty, mother of several children, entered Franklin Square Hospital May 23, 1913, operated upon May 24, 1913, 8.30 A. M. This patient suffered with gall-stone colic for many years during her early life. The disease was not diagnosticated at the time, but the history is perfectly typical. For the past twenty-five years she has had much less trouble until the beginning of the present attack about six months ago. Her sickness began with symptons of indigestion associated with distress in the epigastrium and right hypochondriac region. In spite of all possible treatment, her disease became gradually worse and, after much persuasion, she consented to have an operation done. She had had no elevation of temperature and no marked symptoms of obstruction; the pain was not so much a colic as a sense of great distress in the region of the gall-bladder radiating to the back and right shoulder. The diagnosis was gall-bladder disease with strong suspicion of carcinoma. The operation revealed carcinomatous infiltration of gall-bladder and surrounding parts, including the liver, the duodenum and the colon. A great deal of fluid escaped from the upper part of the peritoneal cavity; drainage was established and the patient's pain much relieved. She returned to her home and died about two months after the operation.

Case I shows the importance of watching the gall-bladder during the progress of typhoid fever; and her rapid improvement after excision of the gall-bladder shows the value of radical measures in such complications.

The desperate condition of Case II was due to long delay. Could her obstruction have been removed, I think she might have been cured.

Case III was most interesting, as well as puzzling. The patient was very ill and prostrated from toxic symptoms, and yet had a normal temperature. Blood count might have helped in the diagnosis, but she was so ill that we were afraid to wait for it.

The operation in Case IV was most desperate. The patient's husband was present. Every ligature applied cut through; the hemorrhage was alarming and I was thankful to control it by the method described. I have seen similar conditions during operation on the appendix, done while the organ was recovering from a severe inflammation. Had we waited until the attack had entirely subsided the difficulties would not have been met and the second

operation would have been unnecessary. No operation should be done at this period, of an acute cholecystitis.

Case V, stricture of the cystic duct, in which the symptoms were entirely different from any other case that I have met with, partial obstruction of this duct was predicted by the family physician.

Cases VI and VII show the danger of long continued gall-stone disease as predisposing to carcinoma.

The above cases all demanded cholecystectomy. In cases where the gall-bladder was not hopelessly diseased, and where there was no stricture, I have done cholecystostomy These cases have recovered and usually have remained well. One of my cases had a fistula of long duration which failed to yield to the usual treatment. She fell into the hands of another physician who closed the fistula with electro-cautery. I found the same thing effectual in another case after other methods had failed.

I am persuaded that the gall-bladder will be removed more frequently in the future. The Mayos, on account of their enormous experiences and wonderful success in these conditions, have done much toward making cholecystostomy the operation of choice. They point to the slightly greater mortality of cholecystectomy. This may be accounted for by the graver conditions in which it has been done. They also point out that the gall-bladder is too small to act as a reservoir, but that probably its function is to relieve tension during the height of liver secretion, and thus to prevent regurgitation of bile into the pancreatic duct. This is an ingenious theory; yet many animals get on without this organ. Is it not more probable that the small inadequate gall-bladder of man, with its poorly developed coats, is a disappearing organ, physiologically as well as pathologically, very like the appendix?

FIBROMA OF THE INTESTINE, EVENTUATING IN INTUSSUSCEPTION AND OBSTRUCTION.

BY
HUGO O. PANTZER, M. D.,
Indianapolis, Ind.

CASE.—Miss O. R., fifteen years old, not strong at any time but ordinarily well, during the last three months suffered occasional abdominal disquietude. This on three occasions attained increased severity, requiring medical attendance. Sickening, colicky pain and burning, mild vomiting, without fever, attended these attacks. The second attack confined the patient to bed for eight or ten days, and left her sore for several days more. The medical attendant of the first two attacks, I am told, feared appendicitis. During the present attack the patient suffered greater pain, and the abdomen became much distended. Purgatives had caused much griping, without bringing any stool, though some gas was passed by rectum. Intestinal obstruction was diagnosticated when I was sent to see her at her home in Fortville, Ind., February 25, 1913. I saw patient the sixth day after the onset of acute symptoms. Oral temperature 99.2°, rectal 100.4°. Pulse, previously about 80 to 90, during this day had acutely weakened in force and ran 110 to 124. The abdomen was considerably distended, variably tender to pressure in various parts. There was tumefaction and dull percussion in different parts of the abdomen, notably about the lower right side. Inspection revealed very little evidence of peristalsis. Auscultation marked a lull of intestinal activity, interrupted by a few tinkling notes in quick succession. The evident gravity of the affection indicated by the sudden cardiac depression, the rise in temperature, and the intestinal obstruction, indicated immediate operation, though definite diagnosis was impossible. Torsion of small intestine, appendicitis with gangrene, pancreatitis, among other diseases were regarded as possibilities. Patient was transported to the Methodist Hospital at Indianapolis, and operation performed at once. Narcosis consisted of two H. M. C. Abbott tablets followed by ether. Median incision from umbilicus downward. Free, clear fluid was found within the abdomen. The small intestines were greatly distended and edematous. The ileum, upward from a point about

10 inches from the cecum, was thickened into a banana-like swelling about 10 inches in length. This portion was dark red and edematous. Doughy in feel throughout its entire length, the consistency was greater at the distal end for about 2 inches, and in firmness like a myoma. Further examination revealed an intussusception to exist, complicated by an intraintestinal tumor. Painstaking efforts were successful in completely returning the bowel, when there was revealed an oviform tumor 1 1/2 inches by 2 1/4 inches of myomatous consistency. This tumor was sessile rather than pedunculate, from the crest of the intestine, indicated by a whitish, indurated and depressed spot the size of a nickel. Three inches of the small intestine were resected, and an end to end anastomosis established. A lesser excisio seemed not warranted because of the acute pathological changes the bowel wall had undergone. Recovery followed without vomiting or even any of the ordinary disturbances attending an abdominal operation. The microscopic examination of the tumor showed it to be myoma. A cursory search in literature reveals intestinal tumors of this size and kind of rare occurrence. Some special works, Hemmeter, Tuttle, Kelly, barely refer to the subject. Subsequent inquiry revealed that the patient, always rather quiet and inexpressive, had latterly become quite inactive and reticent. She was wont to sit stooped forward, with her thighs crossed to the utmost, a position which would favor fullest quietude and external support of the intestines. The patient herself, on being questioned, thought that she had not suffered much pain or distress, except in the three attacks above referred to. It is likely that an intussusception of mild degree had occurred repeatedly, and in turn had extricated itself spontaneously, before the final attack was developed.

DISCUSSION ON THE PAPERS OF DRS. KIRCHNER, PANTZER, KEEFE, ERDMANN, AND BRANHAM.

DR. CHARLES N. SMITH, Toledo.—I shall confine my discussion very largely to the paper of Dr. Keefe, but first, I will speak for a moment concerning a remark made by Dr. Branham in which he states that the typhoid bacillus has been recovered from the gall-bladder in one instance in Welch's laboratory seven years after an attack of typhoid fever. The literature of gall-bladder infections show that there are many cases where the typhoid bacillus has been recovered from the gall-bladder in seven, ten and fifteen, or even seventeen years after. In fact, at the Syracuse meeting of this association some of you may recall I reported a case on which I operated seventeen years after an attack of typhoid fever, the patient being a man, who during the seventeen years was a

semi-invalid with great loss of flesh and strength, who had suffered many repeated rather long-continued severe attacks of diarrhea, associated with adbominal pain and temperature. I drained his gall-bladder for a period of thirteen weeks. The man went home and within a year following operation gained 36 pounds in weight and became strong and hearty.

As regards infantile pyloric stenosis, I think there are few conditions in surgery which require greater judgment and in some instances greater courage in determining when and what to do. The patient is of necessity notoriously a bad surgical risk. Even when they are seen early, there are so many of these cases recovering under medical treatment, so-called, that is under gastric lavage with alkalies, that one hesitates somewhat in deciding upon operative procedures at once, and yet if one delays too long and keeps up lavage and allows the patient to starve still more, he loses what opportunity he has for operative success, so that it requires great judgment and in certain instances considerable courage to undertake an operative procedure.

From my own experience, which has been rather small, and from that which I have seen in the practice of other men and the cases which I have studied in the literature, it occurs to me that in this condition, as in many other surgical conditions, no one operation will meet the indication best in all cases; that is there are certain cases of infantile pyloric stenosis, which upon exhibition, upon exposure, will lead us to do a gastroenterostomy. Notoriously those cases with a discernible or demonstrable tumor, with a thick wall, can be best operated on by a gastroenterostomy because the one thing which is of greatest importance in this operation is the element of time. The operation which can be done the quickest must be done, and I believe the average surgeon can do a gastroenterostomy quicker than he can do a pyloroplasty, the dissection of new growth or piled up tissue, and dilation through an artificial opening into the stomach, with closure of the artificial opening and the closure of the pyloroplasty incision. In some instances, however, where the pylorus is not so greatly thickened, I believe a pyloroplasty, either the Heinecke-Mikulicz pyloroplasty, or the one suggested by Dr. Keefe, can be done in a shorter time than gastroenterostomy, and in those cases I certainly should employ the method of Dr. Keefe, although I have never as yet done so. I do not believe the implied statement of Dr. Keefe, that these cases should be operated upon by any one except a skilled abdominal surgeon. These are operations which require dexterity and speed but there is no necessity for making an emergency operation in these cases, because everyone of them has been subjected or should be subjected to a certain amount of so-called medical treatment, lavage, etc., before operative procedure is determined upon, and when operative procedure is determined upon, a few hours delay will have no effect upon the mortality.

DR. HUGO O. PANTZER, Indianapolis.—With reference to the cases reported by Dr. Keefe: I have not had a case in my practice. I wish to congratulate Dr. Keefe upon his procedure. Its simplicity

commends itself and makes it applicable to many cases. The results following this procedure should be carefully reported for further consideration. Personally, I am prepared to do a different operation, one that I performed some ten or fifteen years ago in a case of benign stenosis of the stomach. After I had reported my case I found the operation had been suggested by another surgeon. The operation simply consists of cutting off the duodenum and implanting it into the anterior surface of the stomach. A transverse incision through the hypertrophic transverse muscular fibers, prevents spasm of the pylorus and it affords a good ostium. The pyloric end, where the duodenum has been detached, is permanently closed.

Regarding the cases reported by Dr. Branham, they are interesting, but I doubt whether we have good reason, except in the rarest instances, to remove the gall-bladder. Reference is often made to stenosis of the cystic duct owing to cicatricial changes in the mucosa. There is not an organ in the body more capable of regeneration than the mucosa, and from my own experience, I would not do a cholecystectomy except in rarest instance.

DR. H. W. LONGYEAR, Detroit.—There is only one phase of these papers that I wish to discuss, which is in connection with the cases reported by Dr. Branham concerning infection of the gall-bladder. I believe it is very difficult in some cases of infection to cure them by drainage. I have in mind the case of the late General R. A. Alger, about whom some of you knew at the time. In that case the infection was due to the colon bacillus, and I kept a drainage tube in for a number of months. I experimented with different chemicals to relieve the condition by sterilizing the bile, but found it impossible to do so. Chemicals were used that would kill the colon bacillus and that were well borne by the patient. Drainage was free into the bowel, yet in twenty-four hours after using the antiseptic lavage, the colon bacillus would be present in the bile the same as usual; and even after several consecutive days of doing this, it would still be in evidence, showing apparently the presence of the continued infectious tract reached by the lavage, viz.: in the hepatic ducts.

I think in cases of infection by the typhoid bacillus we have a very excellent remedy in urotropin. That opinion is the result of the experience I have had. It has proved to be a valuable agent not only in the infection of the gall-bladder, but in other infected areas, especially in the kidney, following typhoid fever, where the bacillus has been found. I have found it extremely useful in those cases. I speak also from a personal experience of my own case. I had typhoid fever and following it hemorrhage from the kidney and suppuration which lasted for fifteen years. I tried all sorts of medication for years without avail, and at last used urotropin, taking 30 grains a day, and the suppuration ceased inside of ten days. The irritation from this had become so incessant that it was reducing me very much; it made me anemic, gave me all kinds of trouble, and gradually reduced the capacity of the bladder to three ounces, the relief from which one cannot appreciate unless he has passed through it. So I do believe in that one remedy we have something

that we can depend upon in medicine for this one thing, and that is infection from the typhoid bacillus.

DR. J. H. CARSTENS, Detroit.—Dr. Kirchner has had a very good and interesting experience. We treat the cases he has reported in the same general way.

So far as Dr. Keefe's paper is concerned, I never saw a case such as he has reported. If I encountered such cases I do not know whether I could persuade the parents of the children to consent to operation.

Before discussing Dr. Branham's paper, I wish to say that urotropin is eliminated by the gall-bladder and by the kidney. A point I want to make is this: sometimes when the gall-bladder is infected very seriously, and you think you can jog along, you can disinfect the gall-bladder by giving the patient urotropin a week or two, and get the gall-bladder in a reasonably healthy condition, whereas if you should operate immediately you would kill the patient.

I always make a transverse incision in the direction of the external oblique and separate the fibers, and then I make the incision straight along the fibers of the external rectus, and when I get through that, then I lift up the peritoneum and transversalis fascia, and make an opening so that I can stick my finger in it, and feel if there are any gall-stones in the gall duct. If not, I pull the gall-bladder up in the little opening, and with a fine suture sew it all around to the peritoneum; I open the gall-bladder and wash out the gall-stones, and by so doing, cannot get any infection in the peritoneal cavity.

Dr. Branham, like the rest of you, whenever you talk about gall-stones, will tell you about the wonderful postmortems made in Germany and by this man in Philadelphia who found 15 per cent. of cases of gall-stones in patients. I have talked about this before. I have made observations on living subjects; I have operated for fibroid tumors, I have operated for ovarian tumors, and for many other pathological conditions, and when I heard wonderful stories of so many people having gall-stones, I made up my mind I would investigate every case I operated on; that I would explore the gall-bladder and keep track of it, and when I have a patient come to me I inquire with reference to symptoms referable to the gall-bladder, whether or not he or she has had any gall-bladder trouble, and so when I operate for fibroid tumors and other conditions I explore the gall-bladder. I have done that 500 times, and how many gall-stones do you think I found? I found two in the living subjects, and so I for one do not believe that so many women have gall-stones. I hold that gall-stones are not common as a general rule, and people who have gall-stones have more or less symptoms, *and gall-stones present a more or less serious condition which sooner or later will cause trouble.*

DR. ROLAND E. SKEEL, Cleveland.—I shall await anxiously the publication of Dr. Kirchner's paper in full so that I may be able to read it deliberately because I think his is a subject that is as important

as any that has been brought to our attention at this meeting. I am quite interested in what he said about, and the emphasis he laid upon, the importance of tympany as a cause of obstruction; distention of the bowel with flatus above a simple kink tremendously aggravates the original cause and may act to produce complete obstruction. These cases of interval obstruction come to us too late, and the reason they come too late while obstruction from strangulated hernia comes early, is because of lack of diagnosis in the former, the original practitioner giving the patient a cathartic, the violent symptoms of obstruction manifesting themselves only after this, because of violent peristalsis with enormous filling of the gut above the kink thus producing a tighter obstruction than originally. That leads to another thought which is that many cases of postoperative obstruction are due to the same thing, viz., catharsis. We can assume that after every abdominal operation there will be some adhesions, and therefore will be some kinking of the gut and if, for illustration, the patient is given a dose of calomel followed by the administration of a large dose of salts; tympany will be produced when if a kink occurs, dilatation of the gut above this will cause more and more kinking and angulation until the patient has complete obstruction. So there are two lessons which Dr. Kirchner has brought out.

In referring to the case of fibroma of the stomach reported by myself last year Dr. Erdmann mentioned the fact that the specimen was not examined pathologically, although macroscopically it was myoma. Incidentally this brings up the curious way in which men of perhaps limited experience in a given line may nevertheless see three or four unique cases in a very short time. Just before leaving home I removed another benign tumor from the stomach, although my experience in the surgery of the stomach is very modest compared to Dr. Erdmann's. Sections were sent to the pathologist for microscopic examination and the report subsequently received stated it was a papilloma although I had never before seen or heard of a papilloma of the stomach. This particular case was diagnosticated previously as a carcinoma and hopelessly inoperable.

DR. FRANK D. GRAY, Jersey City.—I can hardly resist the temptation to say a few words upon the paper of Dr. Kirchner, as it is a subject which interests me very much. In line with a remark made by Dr. Skeele, it sometimes happens that one with a very modest experience will get a run of a particular class of cases within a comparatively short time. For instance, it has been my fortune to have had twenty-eight cases of intestinal obstruction in the last three years, and that experience has impressed me with the fact that intestinal obstruction is one of the tragedies of surgery. The way to avoid the tragedy is to educate. We talk about dealing with the problem of carcinoma by educating the public; I think we should deal with the problem of intestinal obstruction not by educating the public, because it would not do any good, as these cases are usually sudden occurrences, but by educating the general profession to recognize these cases quickly.

Dr. Kirchner made a very important point when he said that the

early symptoms are the important ones. We find practitioners so many times waiting for a typical picture of intestinal obstruction, not only for persistent and constant vomiting, but they wait for stercoraceous vomiting, and by the time they get it the case is too late.

The tremendous tragedy of this subject is illustrated by some remarks I heard Bloodgood make a year ago at a meeting of our state medical association. He said that in twenty-one years' experience in the Johns Hopkins Hospital there were 320 cases of intestinal obstruction, an average of fifteen per year, with a mortality ranging year by year from 40 to 100 per cent. Dr. Kirchner is beating him out by 50 per cent. in some years, in that his mortality has been much lower, and I attribute it almost entirely to his getting these cases earlier.

There is one practical point I would like to emphasize and that is every case of suspected intestinal obstruction is entitled to a rectal examination. In the older patients we may find malignancy which should be attacked from below instead of through the abdomen. In some cases we may find what a colleague of mine found in a certain case. After opening the abdomen he discovered only a sodden mass in the rectum which he dug out after he had closed the abdominal incision. It was a case of fecal impaction in the rectum, and he did an unnecessary laparotomy.

One more thing that is of importance is the causes of death in intestinal obstruction. There has been a great deal of argument pro and con in regard to the causes of death, death in some cases being attributed to toxemia, in others to shock, and in still others to the loss of body fluids, I am inclined to think you cannot charge the cause of death up to any one of these conditions alone. I am sure, in one of my cases death was due to shock because there was no loss of body fluids; the patient only vomited two or three times, and died promptly within an hour after a simple operation for relieving intestinal adhesions in fact shock had developed two hours before operation and never abated. The point was made by Hartwell two years ago that most of these patients died from loss of body fluids, due to vomiting, which gives us a clue to one kind of treatment. We should replace the body fluids by proctoclysis or by intravenous transfusion. We replace in that way what the patient has been losing.

In regard to the technic and the number of cases in which resection was made in these series; in a good proportion of cases we have to do resection, and I think the method of resection is an important matter. To my mind an admirable method of end-to-end anastomosis has been neglected for twenty years. I refer to the old Maunsell method, which enables us to invaginate the two ends through a split in the divided intestine, and to make the junction with a single row of sutures but not as Maunsell did. He used interrupted sutures, and it was a weak point in his technic which allowed the inverted ends of intestines to slip and cause a leakage. We should do a continuous end-to-end interlocking suture. It is a quick operation. I have used it in eight or ten cases and in two cases in particular, where it would

have been difficult to resort to any other method in the lower sigmoid.

DR. THOMAS B. NOBLE, Indianapolis.—Just a word relative to gall-bladder disease and gall-stones. Recently I encountered a case which I feel proves that gall-stones can be developed outside the gall-bladder. This was a case in which two stones were found in the common duct, and no gall-bladder at all could be observed by palpation and inspection of the perfectly smooth, nonadherent hepatic surface. Covering the two hands with gauze and pulling the lower aspect of the liver upward and the gastrocolic ligament downward, making those tissues taut, I could see underneath the hepatic substance at the hilum of the liver a whitish body which, when I split the tissues overlying revealed the hidden gall-bladder, which was entirely an intrahepatic viscus. It required cutting of the liver substance upward from the hilum of the liver for a distance of 3 inches, and I dissected out then a shriveled rudimentary gall-bladder which had a cavity which when opened was found to be perfectly dry and void of mucus or bile. I am quite certain this viscus never held these two stones which we found in the common duct.

This year I have been following the plan of making a diagonal incision, splitting the fibers of the external oblique, and, if necessary, cutting through the fibers of the rectus, and I have been so well pleased with the results I have had I have selected it over others that have been made. It gives one free access to the pathology that here obtains, whether it be relative to the pylorus or duodenum, bladder or gall ducts, or to the kidney. The incision advised by Dr. Carstens I could not feel myself personally satisfied with. I could not myself feel assured that I had discovered the stones which might be hidden in the hepatic duct, or that might be in the common duct, nor could I be certain of any possible pathology that might exist in the pylorus or in the duodenum, which I might have mistaken in my diagnosis before operation and have overlooked by such a meager opening. Maybe I am wrong, but I do not look with such fear upon the dangers from infection in this region. It may be hazardous, but my experience has not been such as to lead me to become fearful relative to making a wide exposure of this very important region. I think incisions here should be sufficiently large to inspect the stomach and the viscera lying co-adjacent to the pylorus because of their very great important surgical character, and I believe that if Dr. Carstens who is known so widely as a very efficient teacher, a man of wide experience and good judgment, advocates such an incision as this, the younger men will be misguided as they have been misguided to my positive knowledge as to the pathology that lies underneath the border of the right ribs. Recently I have had to remove the gall-bladder on two occasions where younger men have by a small opening opened up here and removed stones from the gall-bladder, leaving a small incarcerated stone in the cystic duct which kept up a persistent mucous fistula. These mistakes could have been avoided by a larger opening and a more careful examination of the organs.

DR. KIRCHNER (closing).—I had two motives in bringing this subject before the members of the association. One was to call attention to the various conditions which might underlie obstruction, and the other was especially to emphasize the need for early diagnosis.

Dr. Carstens says he does not meet with these cases so frequently, but in other hospitals postoperative obstructions are quite frequent, and the symptomatology should be borne in mind so that the cases of that nature may be early recognized.

I have found that patients suffering with symptoms of obstruction, as is often the case in strangulated hernia and also in other conditions, by the time they reach the hospital, have often been given cathartics. If pain is present, they are frequently given morphia, and cathartics and morphia have done more to help kill patients with intestinal obstruction than anything else.

The point made by Dr. Gray in regard to rectal examination I brought out in my paper. I have witnessed a laparotomy for obstruction similar to the one mentioned, in which a syphilitic stricture of the rectum was found, and the condition could have been relieved easily by dilatation from below. So a rectal examination should always be made.

I do not believe the subject as to the causes of death has been thoroughly worked over. There are probably a number of factors that bring about fatal results. There is doubt in my mind that toxemia is a potent cause. Given a case of obstruction, with the accumulation of fecal material, which, as the obstruction and condition advances, becomes liquid and greenish, we have there a fluid which is intensely toxic. I believe this condition is, at least, one factor in the cause of these deaths and this toxic fluid explains, perhaps, certain deaths that follow apparently good surgical work. Let us take, for instance, a case such as I had, the first one, where apparently the surgery was well done. There was a distended and disorganized bowel containing liquid fecal matter and gas proximal to the constriction, but the bowel below retained the healthy mucosa. Here we had a distended bowel containing an intensely toxic material which after the surgical repair was allowed to flow over healthy and absorbing bowel mucosa. I believe that in certain instances, this toxic material is the cause of death. Furthermore, shock is undoubtedly a factor in many cases. The loss of body fluids through drainage into the intestine and also from emesis, is also important.

Again, many of these patients are intensely anemic, and it is thought by some that as a result of the toxemia and intestinal conditions, that the intestinal veins become dilated and you have so to say, a bleeding into the abdominal veins and consequent anemia. There are, therefore, many things to be considered, which are likely to cause death.

DR. KEEFE (closing the discussion on his part).—If I understood my friend, Dr. Skeel, he seems to feel that gastroenterostomy can be done more rapidly than a pyloroplasty. A pyloroplasty can be done more easily than a gastroenterostomy. We must remember that a gastroenterostomy in an adult is a comparatively simple operation,

but here we have to do with an emaciated infant, weighing sometimes not more than from 6 to 8 pounds. As no food is passed into the intestine we find it collapsed. The intestine is scarcely as large as my little finger, and we have a different proposition to deal with from what we have in the adult. Then he also stated we may do a pyloroplasty in some instances depending upon the size of the pyloric tumor. The size of the tumor varies very little. It seems to me, we should not base our operation upon that one factor. If the patient requires a rapid operation, we might omit making an incision in the stomach and do the pyloroplasty alone, and that to my mind could be done in one-quarter of the time that a man would take to do a gastroenterostomy.

DR. BRANHAM (closing the discussion).—The case related by Dr. Erdmann brings to my mind a very interesting one I operated on some time ago, in which I removed the pyloric end of the stomach for annular growth, one which did not extend entirely around the pylorus but had considerable thickness. The nature of this growth was afterward the cause of a good deal of discussion. It was examined by a competent pathologist who pronounced it carcinoma; another pathologist looked at it and said it was aberrant pancreatic tissue. To settle the matter we got Dr. Welch to go over this specimen and he pronounced the case one of carcinoma and aberrant pancreatic tissue, saying that both of these gentlemen were right. He said it was undoubtedly a case of aberrant pancreas which had unquestionably malignant degeneration. This patient I operated on about thirteen years ago, and he is still all right.

In reference to the cases reported by Dr. Keefe, he undoubtedly does the best operation in those cases. I feel it is the simplest and most likely method to be successful.

I would like to ask Dr. Carstens if he passed his hand and forearm into the abdomen in all of the 500 cases of which he speaks.

DR. CARSTENS.—In those where I made a large incision?

DR. BRANHAM.—Yes.

DR. CARSTENS.—I did.

DR. BRANHAM.—The question of frequency of gall-stones I feel has been unquestionably settled contrary to the experience of Dr. Carstens. He has either had peculiar cases or has seen very few gall-stones. There is no one who has greater respect for Dr. Carstens' ability than I have, but he is enthusiastic. He is unquestionably wrong this time.

DR. CARSTENS.—My contention is that there are not so many cases of gall-stones as we have been led to believe.

DR. BRANHAM.—As to the proper operation in these cases, we all know the Mayo Brothers have done great work, and probably more work and better work in this line than anybody else. They believe in cholecystostomy, as a rule, yet they give us certain statistics which would indicate very forcibly that cholecystectomy ought to be done in many cases. Their report of the pathological examination of something like 4000 cases—I forget the exact number— shows that in a large number of them there was carcinoma of the gall-bladder,

these gall-bladders having been removed for other causes, and these patients have nearly all remained well. Where a carcinoma of the gall-bladder was sufficiently advanced to be diagnosed and an operation performed at the time, the patients practically all died. These chronic conditions are frequently associated with carcinoma, so that there is a strong indication for removing the gall-bladder if it is badly diseased.

SUDDEN SEVERE HEMORRHAGE INTO AN OVARIAN CYST FOLLOWING DELIVERY.

BY

WM. EDGAR DARNALL, A. M., M. D.,

Atlantic City, N. J.

IT is estimated that of all the neoplasms of the ovary cysts make up 85 to 90 per cent. Boeckel in 1861 explained the formation of menorrhagic cysts by the fact that a Graafian follicle may mature and not rupture. At each menstrual period this is repeated and at each menstrual period one more unruptured follicle is added until the ovary is finally transformed into a mutilocular cyst. Others have adopted this view and have ascribed the small ovarian apoplexies to an unruptured Graafian follicle. The occurrence of small extravasations of blood into the follicle is not at all unusual and is frequently met with. These small hemorrhages have been given the name of "ovarian apoplexies." The influence of menstruation in producing them is probably very small. Daniel thinks it acts by bringing to light preexisting lesions. Smallwood Savage divides ovarian hematoma into two varieties. (1) Hematoma of the Graafian follicle and (2) hematoma of the corpus luteum. In the first the walls of the hematoma are lined with a single layer of epithelium lying on a basement membrane, external to which are two layers which correspond to the theca interna and the theca externa. In the second type, there is a shell of ovarian tissue, the inner wall of which showed newly formed fibrous tissue poor in cells. It has been noted that these small hematomas occur more frequently in association with fibroids than with other pelvic lesions. They may frequently be associated with malignancy of the ovary. In either case they are small and inconsequential and can scarcely be compared with the large and severe hemorrhage that occurred in the case here reported.

CASE.—Mrs. Bessie B. aged twenty-four, Russian Jewess, weight 120 pounds, passed through a normal delivery at term in the hands of Dr. Daniel Jenifer. Her father died at the age of fifty-five from heart disease, but her mother is living and well. The patient is a well-developed young woman, well nourished and has had no previous illnesses except a small ischiorectal abscess at some time in the

past. She has had two children, no miscarriages, no leukorrhea, sleeps well, appetite and digestion good, bowels regular. Urination normal; has no headaches nor backaches. Menstruation began at the age of thirteen and has been regular and painless and with normal flow. She has not been conscious of any pelvic symptoms before or during her pregnancy.

On examination she presents a normal vulva and vaginal outlet, the cervix is softened from the recent pregnancy, but well contracted. The uterus is well contracted, somewhat larger than the fist. On the left side can be palpated a mass about the size of a large cocoanut rising from the pelvis and to the left of the uterus. This is tender on pressure and of somewhat harder consistency than the average ovarian cyst. Heart, lungs and kidneys are normal.

The onset of the trouble was as follows: For four days after delivery, she ran a perfectly normal course without any elevation of temperature or pulse or other symptoms. She was then suddenly seized with an excruciating pain in the lower left inguinal region from which she fainted. Her pulse jumped to 140, temperature dropped to 97°. There were anxious facies, cold clammy skin, air hunger and sighing respiration. Her attendant feared pulmonary embolism or an obscure internal hemorrhage and asked me to see her with him in consultation. After a few hours her pulse had dropped to normal and her temperature had reached 98° under treatment of rest, morphia and ice to the abdomen. By the time I saw her symptoms of obstruction of the bowel had come on. It had been impossible to get a movement after repeated efforts with enemas. She was then vomiting and her pulse had quickened somewhat, being at this time 96, but the temperature was normal. She was immediately removed to the hospital and a laparotomy performed.

On entering the abdomen the uterus was found to be well contracted; the right ovary contained a cyst about the size of a walnut; the appendix was normal but was removed; the left ovary was enlarged to about the size of one's head, dark in appearance and pressing directly upon the sigmoid to such an extent that its lumen was completely constricted. There was no torsion of the pedicle; the cyst was unilocular and filled with dark thick blood. Both ovaries and tubes were removed, and the patient made an uneventful recovery.

The case is an unusual one and the literature is so meager that I have been able to find but two cases similar to this one. At the Atlantic City Hospital laparotomy has been done for the removal of the appendages, by the writer in 291 cases and while the small

ovarian apoplexies are frequently met with no case approaching this one has been encountered by myself or by my colleagues on the staff.

A case similar to this one is reported by Dr. W. C. Jones, in *Surgery, Gynecology and Obstetrics*, Jan., 1913, p. 63. The history of his case was briefly as follows: A patient with pregnancy and delivery, apparently entirely normal, within twenty minutes after the end of the second stage showed an abdomen greatly enlarged. The doctor thought he must have overlooked a twin child in the uterus. On examination he found the uterus empty, thus demonstrating that the enlargement was outside of the uterus. There were no symptoms of hemorrhage, no pain, nor any other pathological signs but a pelvic and abdominal enlargement. The enlargement gradually increased and the patient gradually became weaker. A month after the delivery the tumor had increased to nearly twice the size of a normal pregnancy, but with the prominence to the left side. The physical findings were those of an abdominal cyst, but he had some misgivings on account of the strange history. Laparotomy disclosed a large cyst containing about 6 quarts of a chocolate-colored fluid which was evidently hemorrhagic in origin. The cyst was of the multilocular variety.

Jones' search of the literature was thorough and he appends a long bibliography to his article. The only other case he was able to find was one reported by Robert G. LeConte who saw a patient six weeks after a normal labor. After delivery it was noticed that the abdomen remained about as large as it had been previously. Operation revealed a cyst containing nearly 4 gallons of dark-brown fluid. Dr. Cattell, who made the pathological report, said that it was a multilocular cystoma of the ovary. The contents were of a clear grayish red color and weighed over 32 pounds. LeConte seems to assume that the growth took place, gradually, during pregnancy and that there was no particularly sudden enlargement immediately after delivery, as occurred in my case.

Jones ascribes the cause of the hemorrhage into the cystic ovary to be the sudden lessening of the intraabdominal pressure by the delivery of the child. He also thinks that the pressure was, in his case, a factor in stimulating the subsequent rapid increase in size of the cyst. It is rather remarkable that so great a hemorrhage did not produce any of the clinical symptoms of severe hemorrhage, such as occurred in the writer's case. The only explanation of this is that it is probable that the hemorrhage occurring in his case as well as in LeConte's was gradual and slow, or that there

were repeated small hemorrhages, while in the writer's case it was sudden, sharp and severe.

The sudden reduction of intracystic tension by the lessening of intraabdominal pressure due to the birth of the child would hardly account for the hemorrhage in the case here reported, which took place four days after the delivery when the uterus was well contracted and when the intraabdominal pressure had to a large extent readjusted itself. The most common cause of hemorrhage into an ovarian cyst is torsion of the pedicle, but this also is ruled out because there was no torsion of the pedicle found.

The signs and symptoms of ovarian hematoma are usually so ambiguous as to cause it to be mistaken often for such conditions as chronic salpingitis, tubal gestation, uterine fibroids and appendicitis. The ovary is enlarged in the smaller hematomas, filled with old altered tarry blood brown in color and of the consistency of syrup, containing a number of brown solid particles from pinhead size to that of a grain of wheat.

In most of the cases pain is the most prominent symptom. The character of the pain varies, but usually there is a sharp sudden attack of pain in the lower abdomen, located on one side or the other, and associated with vomiting, retching and fever. The physical signs vary with the size, thickness of the surrounding wall, and the amount of peritonitis or cellulitis present. The swellings are usually small except in such a case as reported by the writer, and are often movable. The tumors are fragile and easily ruptured in attempts at removal and in most cases the Fallopian tubes are not disordered.

Ovarian tumors of all sorts, and especially cysts, almost always produce serious trouble sooner or later, and especially during pregnancy and the puerperium. The most dangerous period is the puerperium. It is the part of wisdom, therefore, to remove them as soon as they are discovered, if possible.

DISCUSSION.

DR. H. W. LONGYEAR, Detroit.—This case reported by the essayist is interesting and points to a pathological condition that we should be on the lookout for. I believe these hemorrhages into ovarian, or parovarian cysts are prone to take place any time during pregnancy. The very condition of pregnancy, with its accelerated blood supply of the uterus, predisposes toward it, and I think that we should be very suspicious of some such thing if a patient who is pregnant has attacks of pain in the pelvis. She should be examined very carefully.

It has been my good fortune to operate on two of these cases within the last year, one of which was an ovarian cyst adherent to the culdesac and posterior uterine wall. An examination was made by her physician because she complained of a number of attacks of sharp pains in the pelvis. He discovered this cyst, which was pressing the pregnant uterus, in the fourth or fifth month, against the pubes. I was called and operated, and found a hemorrhagic cyst of the left ovary. It was so tightly adherent to the uterus that this organ could not rise out of the pelvis, and this had led to the early attacks and threatened abortion. If the uterus could have risen the pain would not have been so severe and she might have gone on to delivery or, on the other hand, great hemorrhage and rapid growth of cyst might have ensued. A larger hemorrhage had taken place and the pain had recently become more severe in character. The cyst was removed, the patient relieved, and the pregnancy continued without accident. She is about to be delivered.

The other case was one of parovarian cyst, the woman having aborted at the fifth month. It was hemorrhagic, and I removed the cyst after she had recovered from the abortion. I also found a similar condition on the right side, although much smaller. I believe the course of pregnancy is interfered with in most of these cases, and they should be detected early when operation is simple and can often be done in the presence of pregnancy without necessarily bringing on abortion.

DR. HUGO O. PANTZER, Indianapolis.—I had a similar case about 1890. It antedated immediately my going into a specialty. The woman presented herself at my office with a very large ovarian cyst uncomplicated by pregnancy. She went home, taking a street car, and sustained a jar when leaving the street car. I was sent for within an hour or so. I found the patient suffering great pain and collapse. The abdomen was hugely enlarged and there was dulness everywhere. Operation at first was postponed on account of the general condition of the patient. Operation a few days later revealed a torsion of the pedicle and excessive intracystic hemorrhage.

DR. THOMAS B. NOBLE, Indianapolis.—These cases are of decided interest both in reference to diagnosis and surgical technic. My experience has led me to fear greatly dead blood in these tumors. By that I mean blood which has been poured out into these cysts in such quantity as to make them wholly hemorrhagic, and allow it to remain until the blood has lost its usual physical character and has become thick, tarry, grumous and sticky. Early in our work we were of the opinion that this was innocent material, and there was not the care exercised in the prevention of soiling that we would exercise in ordinary infective cases. In the absence of evidences of infection in the periadjacent tissues, these cases were treated as we would other cases indifferently relative to the protection of the other abdominal viscera. I came to grief in an operation upon a rather prominent woman, who walked into my office with this condition, and was carried out of the hospital in less than forty-eight hours following the operation. In that operation I found that the changes in

the blood in the ovarian cavity had softened the ovarian sac or cortex, so that when the abdomen was opened and the mass was about to be removed the sac ruptured and smeared this material through the abdominal cavity. This was cleaned up, wiping it out with moist cloths. My patient died with all the evidences of a violent peritonitis within forty-eight hours.

I have been struck with the toxic character of this material when found in the ovary in cases in which it has existed sufficiently to produce these physical characters in the blood. Since then, these cases have been operated with as much care as if we were operating in the presence of violent pelvic infection, and if perchance there be any soiling the abdomen is thoroughly washed and irrigated and cleansed, and since treating my cases in this way, the sequential reaction has been a great deal less than it was formerly.

I would like to hear an expression of opinion from those of experience relative to the toxicity of old blood in this region.

DR. HENRY S. LOTT, Winston, N. C.—Little points of diagnosis are always of interest to me. DR. Darnall in his paper says the fact that the mother had a nursing babe would have eliminated an ectopic, and it might be of interest here to mention that I removed a four-months, ruptured ectopic gestation from a mother with a nursing babe.

DR. H. W. LONGYEAR, Detroit.—In regard to the toxicity of old blood in these cases, I have never had the experience that Dr. Noble has had with that condition, and I do not believe that it exists except in very exceptional cases, and I think his case was one of this character. It is possible the cyst may have laid against the rectum and became infected in that way, but I am sure it would be wrong teaching, to go out from this body, that the abdomen must be flushed and carefully cleansed after operations where we find this old thick grumous blood in the abdomen. I think it is harmful to do that. I do not recall a case in which I have had any trouble from sepsis or peritonitis following, that I could possibly attribute to that cause.

DR. DARNALL (closing the discussion).—I am very much obliged to the gentlemen for their interesting discussion. I feel that these cases must be more common than the literature shows. In searching through the literature I could find only two other cases reported; but men of experience must have run across a number of these cases.

As regards dead blood mentioned by Dr. Noble, I quite agree with Dr. Longyear, I do not think the blood itself is toxic. The thing that makes it toxic in a case like this is the same thing that makes it toxic in the old ectopic. If the blood has been lying in the pelvis for several days, it becomes infected with the bacillus coli communis, and may go on to pus degeneration, and we have to open the posterior culdesac and drain it. It is not because of any function of the blood particularly, but the infection is due to lying against infected tissue.

A SEVEN-POUND OVARIAN TUMOR THAT DEVELOPED IN NINE DAYS.

BY

J. H. CARSTENS, M. D.,

Detroit, Mich.

THAT a woman in perfect health should develop a good-sized tumor in nine days seems hardly possible; and, with considerable experience, I have never before seen anything like it; nor can I recall reading of such cases. I have seen a papillomatous cyst develop to a very large size in two or three months, but never a simple cyst. On account of the peculiarity of the case, I thought it might be of interest to report it.

The case is that of Mrs. Z., æt thirty-six, mother of two children, the youngest eight years old. She is about 5 feet 6 inches in height, weighs about 145 pounds, looks the very picture of health, and has always been well. Menstruation perfectly normal; never had any pelvic trouble.

One morning she got up and noticed that her abdomen was unusually large; she took a cathartic without relief, and noticed her abdomen increasing day by day. She consulted a physician, who gave her some medicine, but without apparent relief. It still increased in size; she became very much worried and began to feel sick; loss of appetite, and "kind of feverish," as she expressed it. She came to me just nine days after the onset of the trouble, when I got the above history.

On physical examination I found an intraabdominal enlargement extending from the symphysis pubis to near the umbilicus. When lying on her back it was rounded, dull on percussion and fluctuating; nothing could be felt through the vagina, except that the uterus was apparently, normal. Taking her temperature I found it was 100.5.°

This was a peculiar case. Certainly, it was not a full bladder, as that organ was empty. It was not ascites, as it was fixed, encysted. It was not tubercular peritonitis, as that condition comes on more slowly, and would not be as rounded and fixed, even if encysted. An ovarian tumor is not accompanied by fever, as this was. It could not be an abscess developed in the abdominal walls or anywhere above the bladder, as there would have been some pain, and the onset not

sudden. It could not be a malignant growth, as that would develop slower. It could not be an intestinal obstruction or perforation, as there were no symptoms indicating inflammation of the bowels. It could not be pregnancy, as she menstruated regularly, and the uterus was of normal size. All things considered, it was certainly a most peculiar case. It was sudden in its onset, showing a slightly septic condition at the same time. If it had developed in the course of a couple of months, and without fever, the diagnosis would have been simple—a long-pedicled ovarian cyst.

In the course of time we all develop a Sherlock Holmes like mind to unravel mysterious cases, and so I decided this woman had developed a simple ovarian tumor which had produced no symptoms, and had filled the pelvic cavity until it had grown so large, that one night it popped up above the rim of the pelvis, and the next morning the patient discovered enlargement.

While the tumor was being forced out of the pelvic cavity, the pedicle became partly twisted, sufficiently so to interfere with the return circulation; as a result some of the veins had ruptured, and there was a gradual filling up of the sac with blood, and an increased flow of serum which, evidently, occurred also during this time. By moving around, attending to her usual work, the pedicle in a few days became still more twisted and finally the circulation was entirely cut off. The tumor then became gangrenous, and the sepsis began to develop just when I first saw her. I explained to her the seriousness of the condition, and the need of prompt interference. She went to the hospital the next day and I operated April 24, 1913. The operation was a simple one, there were a few slight adhesions, but special care was taken when the sac was emptied not to contaminate the peritoneal cavity. The sac contained a dark, grumous fluid, having the odor of decomposition. The sac itself was green in spots, showing the evidence of gangrene. The infection was from the colon bacillus. She made a quick and smooth recovery.

The peculiarity of the case, the sudden onset and rapid growth, make it unique. Hence I thought it was worth while to put the case on record.

APPENDICITIS IN YOUNG WOMEN.

BY

H. S. LOTT, M. D.,

Winston, N. C.

THE removal of an appendix is a very simple matter, but a vent in the abdominal wall of a young woman, and an unwarranted, invasion of her pelvic and abdominal viscera, is a very serious one.

With the light that has been shed upon its pathology, and in the presence of a certain group of symptoms, we feel very sure to-day of the appendix as a focus for attack. The patient has colicky pain, of either sudden or insidious onset, at first diffuse, but gradually localizing in the lower right quadrant, with nausea of sudden onset, and vomiting, which may be projectile, and nearly always a constipated bowel. The nausea and vomiting may not be marked, and the lower bowel may be easily emptied, but this should not mislead us.

This clinical picture portrays a very large percentage of cases of appendicitis in first, or perhaps in second attacks, and these may occur, and subside, without gangrene, or rupture; the addition of such accident making a more typical picture, with its sudden agonizing pain, subnormal temperature, and rapid weakened pulse.

Such cases constitute the rule, and in males a given number of them, with some slight deviations, will be very much alike, but there are exceptions, and these occur most frequently in young women, and it is the exception, with its importance, that I wish to emphasize.

Tubal and ovarian pain is a very common thing, and especially in young women; but when we think of the delicate structure of these organs, and the functions they perform, it is not really so much a cause for surprise.

Let us for a moment consider the tubes and ovaries, and their close relationship to the appendix. Their normal functions, in common with those of the female procreative organs are accomplished in cycles of turgescence, and of retrocession. Like the tidal wave of the ocean, the currents come and go. Furthermore, the muscular fibers entering largely into their structure endow them with expulsive power—recurrent, rhythmic, paroxysmal, and without volition to throw off an additional burden when it has reached the limit of endurance.

The arterial supply to these organs furnishes, "at times" (Deaver) a branch from the ovarian direct to the appendix. In periods of congestion, whether occurring at the height of the menstrual wave, or during the interval of retrocession, this anatomic arrangement of blood supply insures a bond of sympathy between the uterine appendages and the vermiform appendix, which must account in great part for the obscure blend of symptoms, and should put us on our guard in the matter of diagnosis, refinement of which is the acme of professional attainment.

If groups of symptoms in different patients, even with a similar pathology, were always just the same, diagnoses would never be difficult or obscure. But, unfortunately, they are not, and very few cases come up to the text-book standard of symptomatology. In appendicitis, simple however, I really believe that the symptoms come as near to being uniform as in any condition with which we have to deal.

To recapitulate: pain is the most important symptom of all, because its character will shed most light upon the organ, or organs, concerned. It may be of either sudden or gradual onset, often following a hearty meal; at first diffuse, perhaps, but gradually becoming most intense in the lower right quadrant of the abdomen. Continuous, mark you, maybe with slight remissions of severity, but continuous and accompanied with nausea, and often with vomiting.

Now, these two symptoms—pain and nausea—being the cardinal ones which guide us in early cases, before the occurrence of gangrene or perforation (these accidents presenting a picture of their own), let us study them a little, and compare them with the pain and nausea which so frequently accompany disturbance of the procreative organs in young women. This disturbance may be either normal or pathological, but in either case the character of its most prominent symptom is determined by the anatomical structure, and dominant functions, of the organs concerned.

At the menstrual epoch, which means the height of the menstrual wave, and also signifies congestion of the uterus and its appendages, most young women have some pain, and many of them have a great deal, attended with nausea. This pain is not continuous, but, like all pain accompanying expulsive crises on the part of these organs, be it full-term labor, abortion, ectopic gestation, or an effort at expulsion from the uterine cavity of a submucous fibroid or a polypus, it is recurrent, rhythmic, distinctly intermittent and *expulsive*. The nausea also differs somewhat from that of appendicitis, in that

it comes just as the pain is at its height, and lasts, perhaps, throughout the interval.

In addition to these distinctive characteristics of the pain and nausea which accompany appendicitis, the "pair of points" of Dr. Robert T. Morris are of much value; his conception of this reflex sympathetic phenomenon being very beautiful, and very practical. Evidence from these "points" is elicited by making deep pressure just to the right, and just to the left, of the umbilicus, over the sympathetic ganglia, which send nerves of communication, both to the pelvic organs, and to the appendix. Pain, produced by pressure on both sides, would indicate that the tubes and ovaries are involved, while if pressure on the left is negative, and pressure on the right is painful, the appendix is most likely the causative focus.

That the appendix should be removed is beyond question. However, during the past few years two notable cases have been under my observation, in which the entire group of symptoms, as a rule dependable, were certainly misleading. The patients were white, unmarried, and sixteen and seventeen years of age respectively. Through recurrent attacks I had watched them closely. The pain seemed to be independent of menstruation; it was on the right side, at the classic point of McBurney, and was accompanied by nausea. They were of constipated habit, and suffered with disturbances of digestion. Feeling pardonably sure of the diagnosis, operation was advised and accepted. In both cases the appendix was free from congestion, and free from constriction of its lumen; of normal size and location, with a normal meso attached. Of course, the organ was removed in each of these cases, but the patients still have pain, in recurrent attacks, in the same location, and are the victims of obstinate constipation.

Thus, with the additional scar tissue, and its possible *reflex neuroses*, even a symptomatic cure was not effected; and to complacently class these two cases among the "exceptions that establish the rule" does not satisfy me at all, for my surgery did not bring relief to my patients; yet I do believe, most emphatically, that a close and careful study of the character of the pain, and of the rationalè, as well as of the physical signs, will help us to a correct diagnosis, which is of prime importance in cases of painful pelvic and abdominal disorders in young women.

In clean cases especially, the method of removal is important; any method must aim at avoidance of raw surfaces for adhesion, and lessening or distorting the lumen of the bowel. The one seeming to me most surgical, because it accomplishes this, and also because it

leaves no buried ligature, or "dead stump" for subsequent sloughing, is that of my friend and teacher, Dr. Joseph Price.

The mesoappendix is freed in one tie of medium silk, including the artery, and leaving a generous stump, with one arm of the ligature left long for future use. Now, with the appendix held upright, its base is transfixed on either side, taking two coats of the bowel wall, with two plain sewing needles about No. 8, armed with fine silk. The needles are left "*in situ*," while the appendix is cut off, across the long axis, and flush with the bowel wall, with scissors. Each needle, in turn, is promptly drawn through and a tie is made; this closes the opening in the bowel and the edges of the lines of incision are approximated evenly. A running whip-over stitch is now taken with the upper silk to the lower angle of the removal, and the silk cut off. This can be reinforced, if you please, by a like running stitch made with the remaining lower silk, starting from the lower angle of the incision, folding in the first row, and going just a few stitches beyond the upper tie, where a final tie is made; to one arm of which is fixed the remaining long arm of the mesostump ligature, thus grafting the stump of the mesoappendix comfortably over the site of removal, and leaving no raw surface, no dead space, and no dead ligature or stump for future slough, and effecting the least amount of anatomical distortion to either its lumen, or the arrangement of the muscular fibers which control the peristaltic function of the cecum.

DISCUSSION ON THE PAPERS OF DRS. CARSTENS AND LOTT.

DR. J. H. CARSTENS, Detroit.—Did you finally get those patients well?

DR. LOTT.—No, sir.

DR. FRANK D. GRAY, Jersey City.—I would like to ask the reader of the paper if there was any evidence of Jackson's membrane in the cases he operated on? In so many of these cases we operate for appendicitis and find a normal appendix, but find also that Jackson's membrane is the cause.

DR. CHARLES E. RUTH.—A few weeks ago I had a patient come to me that gave a history somewhat similar to that narrated by the doctor in his case. This patient was operated on by another surgeon the year before with absolutely no relief of the symptoms. We made a careful examination of the patient, taking an *x*-ray, and we found that the colon ascended to nearly its normal position on the right side at the hepatic flexure, and then descended to almost the cecum, and from that point there was another acute angulation that passed directly from the cecum to the splenic flexure. It was impossible

to get the bismuth to pass the second angulation. I believed from appearances that we had angulation of the colon produced by the so-called Jackson membrane, or that it was due to omental or other adhesion resulting from the previous operation. The patient was vomiting every day and suffered pain more or less constantly. On opening the abdomen we found a band of omentum extending from what should have been the median position of the transverse colon down into the right iliac fossa, and was as large as my finger and binding the transverse colon down into that position, making an acute angulation at the hepatic flexure and another acute angulation of the colon near the cecum. The operation brought complete relief, and the patient has had no vomiting since. I think it simply emphasizes the fact that in these chronic cases we must not get in too big hurry to operate. We must use all the means we can to make a correct diagnosis before we open the abdomen. It is a different thing if there are acute symptoms indicating danger, but when the case is chronic and we have time to work out the diagnosis, we will do these patients a service by so doing, and when the abdomen is opened we should examine for these pathological conditions that may be the important factors, remembering always what Dr. Binnie says, that some of us find the cecum pathological because it is mobile, and some find it pathological because it is fixed, and we have to be careful how much we give way to our preconceived prejudices in those cases of supposed pathology.

DR. HUGO O. PANTZER, Indianapolis.—I would like to call attention to a symptom or sign in these cases that should be included not only as one of the cardinal symptoms, but one that has precedence over every other symptom. Pain, nausea, abdominal rigidity, pertain to many abdominal conditions in the early stage. We would often be absolutely at sea if we did not have temperature as a differential sign. Oral temperature is no safe guide. The rectal temperature taken at this stage in practically all cases will be found elevated. An elevated rectal temperature is present even when oral is found normal, or even subnormal. Sometimes this difference may be as much as two or three degrees. In gangrenous appendicitis at the early stage, you will commonly find a subnormal temperature by the mouth, and a temperature three, four, or five degrees higher by the rectum. For one who has made active contention for this point, and found little following, it is a matter of greatest gratification to note that the differential temperature is being noted and qualified as an important diagnostic aid by Dr. Lucien Howe, of Buffalo, N. Y., in an article read before the recent meeting of the American Medical Association, entitled, "Temperature of the Conjunctiva."—*Why not* look for differences in temperature varying with the proximity or remoteness to the seat of the inflammation?

DR. J. H. CARSTENS, Detroit.—This seems to me to be a case of wrong diagnosis. I think these girls are suffering from dysmenorrhea, not at the menstrual period, but in the interval, what the Germans call "Mittelschmerz," and if the doctor had examined the ovaries and tubes, when the opening was made, and felt down in the

pelvis he would have found some trouble there. Perhaps there was some ovarian trouble, but I do not believe it. He did not make a vaginal examination because they were virgins. When they were under the anesthetic, if he had made a digital examination I think he would have found the uterus bent over and kinked, and if he had put in a stem pessary his patient would be cured. This could have been done at the same time, the patient would never have been the wiser, and the doctor himself would have been relieved of the idea that she would have to have another kind of operation.

DR. H. W. LONGYEAR, Detroit.—It occurs to me, this whole question is one of differential diagnosis, and the essayist brings up a very important matter, namely, the differential diagnosis of appendicitis in women as distinguished from that in men, because we have not only the reproductive organs to consider, but we have another condition which was mentioned by one of the speakers, and that is displacement of the colon. I think that is a very important matter to be considered in differential diagnosis, In women we know we have ptosis of the colon very much more frequently than in men. In some cases the cecal end of the colon has dropped so much that the appendix lies behind the uterus. In cases of appendicitis, with such displacement, what is the value of pain at the McBurney point, as a diagnostic symptom? Absolutely none. It is misleading to be guided by pain at McBurney's point in making a diagnosis of appendicitis in women. My idea of the doctor's cases is this: if he had made an *x*-ray before his operation he would have found that the cecum was very low, and the appendix down in the pelvis, that the pain consequently did not come from the appendix, but it was caused by angulation of the colon, stagnation of its contents and dilatation of the cecum. The pain was cecal. It was in the cecum because the contents of the colon could not be pushed forward and the cecum was in a state of constant dilatation and tension. These are common cases in women and should be considered in this matter of a differential diagnosis of appendicitis.

DR. ROBERT T. MORRIS, New York City.—There is one particular group of cases in which we have fibroid degeneration of the appendix, in which you will find a thickening of the tunica albuginea of the ovary. In these cases you will often find Jackson's membrane, and Lane's kink. We have a group of embryonic defects. Whenever anything is wrong in the whole anatomy of that patient, there is just as likely to be pain in those defective structures as there is in the investing membranes of the brain in the form of headaches. The sympathetic disturbance will give pain in a fibroid appendix, in a sclerotic ovary or in the investing membranes of the brain about equally often, and we have to consider that fact in dealing with defective structures.

Dr. Carstens thinks a stem pessary will straighten the uterus or will cure the flexion. Flexion is like a cough, a sneeze, or any other symptom. Flexion is a symptom and means something else to be looked after. Unless we consider these other things we cannot accomplish much by tinkering with a fibroid appendix, a sclerotic ovary, or flexion of the uterus.

DR. THOMAS B. NOBLE, Indianapolis.—Dr. Lott has presented a very clear statement of facts. As Dr. Longyear has said, it is a question of differential diagnosis and brings before the observer as wide a field as the subject of headaches. Kepler once said that a woman was a constipated animal with a pain in her side, due to habit, which produces an incompetent dilated colon, with sequential suffering therefrom. Habit is one thing, inheritance another, physical construction another, hypoplasia another, out of which we get lying neurons —nerves that carry false impressions. Out of this vast field we are to analyze actual anatomical defects, as real disease of the appendix and adventitious membrane; ovarian, uterine, colonic angulations; gastric and duodenal ulcers; and other pathological states. There is one thing which has not been mentioned which I feel will account for the symptomatology which has been given, and that is an incompetent and regurgitant ileocecal valve. I do not believe enough attention has been given to this structure. We have heard much about the pyloric sphincter and not enough about the ileocecal valve. The women who lives a sedentary life, and is constricted with a corset, who develops constipation by habit, in time can easily develop a dilatated incompetent caput coli just the same as she can develop a dilated, incompetent heart, and regurgitation in the matter of heart function means stasis. So regurgitation at the head of the colon means stasis of intestinal contents. Stasis in the circulation of the heart produces discomfort and pain. The whole question is one of differential diagnosis and every method of physical diagnosis must be taken into consideration. The rhinologist, the oculist, the *x*-ray man, test meals—everything that we can bring to bear upon these cases to analyze and bring out their physical defects, both general and local, must be brought in, if we are going to make a correct diagnosis and give these patients help.

DR. H. WELLINGTON YATES, Detroit.—I have been very much interested in the emphasis which has been laid on pain in this disease, and its constancy. While there are a few cases in which there is very little or no pain, it is surprising in the very acute and fulminating cases, and especially those of gangrenous type, how soon the pain subsides. This is only evidence that gangrenous appendices very often give little peritoneal irritability, and just in proportion as they give little peritoneal irritability, we have less vomiting, less rigidity, and less general symptoms.

The subject of appendicitis in young women is more interesting than any other stage of life, inasmuch as these cases we just talked of are particularly apropos. One point the doctor did not bring out, which I presume he considers in his general practice, and that is the early and frequent use of the blood count. It is in the younger class of patients that it is particularly important, in that we should take a blood count at the beginning to see whether the patient has a marked leukocytosis, and also whether or not it is increasing and determine, at the same time, whether she is at the period of menstruation, or whether or not she has just taken a full meal, and so on. Only frequent examinations will determine that.

DR. LOTT (closing the discussion).—I wish to thank the members very much for their discussion. The Jackson membrane was not present.

In reply to Dr. Carstens' question the patients were not cured. I did not use the stem pessary. I never have used it, and really I would be afraid to use a stem pessary. One of these patients has since married and is now four months pregnant. The cecum was low, and the suggestion of Dr. Noble of the possibility of a faulty ileocecal valve is an excellent one and quite tenable.

I did not make a blood count. In fact, I expected simply congestion. I did not expect either gangrene or pus. The rigidity of the right side was not marked, but it was present. Neither of these appendices had the hard feel which would suggest fibroids, and short of microscopical examination I could not answer that question positively.

OMENTOCOLOPEXY.

BY
H. W. LONGYEAR, M. D.,
Detroit, Mich.

THE operation termed "omentocolopexy" was designed by the author for the purpose of forming a support for the dropped transverse colon, hoping thus to cause the angulations at the hepatic and splenic flexures of the gut to be less acute, with consequent relief of symptoms due to colonic irritability and stagnation.

If successful, this simple operation should, in many cases, obviate the necessity of subjecting patients to the more radical operations of resection and anastomosis.

The author has thus far performed the operation on but four cases. While the results have been sufficiently encouraging to lead to a continuation of the work, the small number precludes their use for statistical purposes. The operation is, therefore, offered as one of probable utility, its value to be determined. *x*-rays were taken of the cases previous to operation, and it is intended to ray them again after sufficient time has elapsed to determine if permanent mechanical results have been obtained.

The operation consists of uniting portions of the great omentum to the parietal peritoneum and the subperitoneal aponeurosis in such a manner as to raise and support the dropped portions of the colon. This is accomplished by introducing and suturing, through punctures in the peritoneum and aponeurosis, one or more small button-shaped masses of the omental tissue, selected and formed at points near the parts of the colon requiring suspension.

The operation may be made through any abdominal incision from which the points of suspension can be reached. The *x*-ray findings, which should be obtained with the patient in the erect position, will indicate the degree of ptosis of different sections of the gut and the points requiring suspension.

The technic is as follows: After opening the abdomen, breaking up adhesions, and doing any other necessary intraabdominal work, the sections of colon to be suspended are noted, and at a point about two inches from the gut, at each section, a small portion of the omental tissue is grasped with tissue forceps, including the entire thickness of the membrane, and, with a few stitches of Pagenstecher linen, a

pea-sized button is made of a part of the tissue held up by the forceps, the thread being left with both ends long. There may be one, two, three, or four of these buttons, according to the length of gut to be suspended. The sections of omentum thus secured should be from 3 to 4 inches apart, to preclude the possibility of strangulation of any viscera which might pass between them. The buttons of omentum are then fixed by drawing them through a puncture in the peritoneum and subperitoneal aponeurosis by means of a long curved ligature carrier (Barrett's). This is thrust in from the abdominal incision, carried along above and parallel with the aponeurosis to the point desired, then turned, and the dull point forced through the aponeurosis and peritoneum. The jaws are then opened to enlarge the puncture, the suture ends of one of the portions of omentum grasped, pulled through, and with it the button of omentum, which is then sewed fast to the aponeurosis in this position by the suture attached to it. Each button of omentum is treated in a similar manner, placing them in such positions as will best serve their purpose of suspension. The advisability of closing the gaps between the fixed portions of omentum by suturing the intervening omentum to the parietal peritoneum has occurred to the author, and it is his intention to do this in future cases, as this would make the fixation stronger, and would preclude any possibility of the incarceration of other viscera between the fixed points. Made in this way, the stomach would also be supported, as in Coffey's hammock operation the technique of which was not known to the author previous to the performance of his "Omentocolopexy."

DISCUSSION.

DR. J. H. CARSTENS, Detroit.—I would suggest that Dr. Longyear, when he publishes his paper, also publish with it those *x*-ray pictures. They would make the text clearer and show what can be done.

DR. LONGYEAR (closing the discussion).—The operation is of value in preventing readhesion of old adhesions which have been broken up. In cases of Jackson's membrane where the gut has been pulled down into angulation, where adhesions are broken up, and readhesion is likely to occur, they can be cared for by this method. It is of value in these and similar cases, as well as when used for the relief of coloptosis.

A REVIEW OF THE PLASTIC METHOD OF CLOSING VENTRAL HERNIÆ.

BY

LOUIS F. SMEAD, M. D.,

Toledo, Ohio.

THE perfection of methods of operation adequate to meet any and every kind of ventral hernia is of recent date. Bull(15) and Coley no longer ago than 1896 wrote as follows: "The operation (for ventral hernia) appears to have a trifling mortality, but the permanency of the cure is still open to doubt."

Without expressing too great confidence in the present generation of surgeons, we may say that the ultimate results in all except the very largest ventral hernias are very satisfactory.

Much of the early work for the cure of ventral hernia was done upon those occurring in the midline. The congenital hernias of the abdominal wall, other than inguinal, were found most frequently in the linea alba at the navel or above or below it. Moreover, the mass of early abdominal sections were for gynecological conditions and midline incisions were used. It is, therefore, a fact that the development of the operation for ventral hernia can best be studied in the literature of midline hernia, and especially in that of the umbilical variety. Furthermore, the principles of operation evolved for hernia in this position can easily be adapted to any other form of ventral hernia.

Spontaneous cure of small umbilical hernias is the rule in children, but rare in adults. Nature always tends to close any circular opening in the body unless prevented by some secretion, the ingrowth of mucous membrane or the presence of a foreign body. Under certain conditions, therefore, we might expect small circular openings to close, but the large, and especially the elongated ones, nature cannot obliterate.

In 1836 Gerdy(27) reported the first operative cures in non-strangulated ventral hernias. He inverted the rupture, skin and all, through the ring into the abdomen and, without a skin incision, sewed the edges of the ring together, passing his sutures through the skin. His final step was to inject ammonia into the sac and gradually cause its obliteration.

In 1882, Bigelow(8), of Boston, used the same method except that after inverting the entire hernia into the abdomen he held the edges together with adhesive plaster while sloughing out the skin sac.

The next step was taken by Simon(57) as reported by Hadlich. After inverting the hernia, skin and all, into the abdomen he removed a strip of skin 2 cm. wide around the edge of the rupture and sewed in three layers, the first suture closing the edges of the inverted skin sac, the second the whole thickness of the ring, and the third the external skin. He reported two successful cases.

Simon's operation was modified by Hegar and Kallenbach(33), Jeffremovsky(36), and Hoffat(35).

The next advance in the operation for ventral hernia consisted in the removal of the skin and other tissues overlying the peritoneum. This was first done in a nonstrangulated case by Burkheardt(18) in 1883.

Simple lineal approximation of the margins of the ring did not prove satisfactory. The edges were brought together only under tension and did not unite. New hernias even developed in the transverse cuts made by stitches.

Many modifications were attempted and much discussion occurred as to the value of trimming the edges of the ring before uniting them, and as to the disposition of the sac.

To Lucas Champonnière(20) belongs the credit for the next advance. Instead of simply uniting the edges of the ring, he approximated the anterior surface of the fascia about the hernial opening. This he accomplished by turning in the layer of sutures, closing the ring with one or two rows of Lembert sutures as one does in an intestinal suture

Kocher(42), Tavel(60), Eschenbach(25), and Bier(7) employed modifications of the Champonnière method, closing the wound transversely or longitudinally and using various suture materials.

In 1886 Maydl(47) brought forward a principle which to-day is fundamental. He opened the anterior rectus sheath on both sides of the ring and sewed peritoneum, muscle, fascia and skin separately. This was the first of the so-called flap-splitting operations.

Balandin(3) had approached the idea when he modified Simon's crude operation by extending the incision around the ring not only through the skin but into the muscle. He, however, did not remove the skin sac, and he closed with through-and-through sutures and not in layers.

Tait(59) modified the Maydl operation by employing a principle he had used in vesico-vaginal fistula. He made an incision through

the anterior rectus sheath on each side well into and splitting the muscles into anterior and posterior flaps. The posterior muscle flap he sewed with the peritoneum and fascia transversalis; the anterior flap was united with anterior rectus sheath.

Sänger(55) and Chrobak(21) were active in the early work with the flap-splitting operation.

Lexer(44) was among the first to use a tension suture in operating upon a hernia. He closed the peritoneum and, without opening the fascia, put in a wire purse-string suture about the ring. This was tightened and the edge of the ring sutured. It was then drawn together as much as possible and the folds made by the drawing of the circular wire suture were sewed together.

Kausch(38) used an ordinary through-and-through tension suture taking in muscle and fascia. He buried the tension suture by drawing the fascia together over them.

Hammesfahr(32), in 1895, used deeper tension sutures, passing them entirely around the recti muscles. Without opening the rectus sheath, he passed sutures through the rupture ring and under the recti on each side to the outer edges of the muscles. The sutures then passed through the fascia and over the muscles to be united in the midline. He then sewed the ring and tightened the tension sutures, burying them under the skin.

In 1897 Goldspohn(1) employed a removable tension suture. He passed doubled wires 6 cm. apart between the recti muscles and their posterior sheaths, bringing them through the skin at the linea semilunaris where the doubled sutures were tightened over gauze pads sufficiently to allow the peritoneum, muscles and fascia to be sewed together. The tension sutures were then drawn up enough to remove the strain from the approximating stitches.

The idea of doing an omphalectomy, when operating for umbilical hernia, was first suggested by Storer(58) in 1866, but was employed independently by W. W. Keen (39) in 1888.

The so-called Condamin(22) operation consisted in making a half-moon incision down to the fascia at the periphery of the hernial sac, dissecting to the edge of the ring, opening the abdomen, freeing the sac of its contents and removing sac, skin, umbilicus and all without the extensive dissection required in attempts to free the whole rupture sac. The maneuver is a valuable one and was first reported by John D. Maury(46) in 1891 and by Condamin(22) in 1892.

Numerous and ingenious muscle-plastic operations were brought out in the development of the operations for umbilical and ventral hernias but they were, for the most part, soon discarded.

In 1893 Gersung(28) was the first to advocate the use of the recti muscles as the chief tissue in closing a hernial opening. After uniting the peritoneum and the edges of the ring, if possible, he opened the anterior sheath of each rectus along the inner margin and freed the muscles thoroughly from their sheaths and from the lineæ transversæ. The mobilized muscles were then united in the mid-line; the outer edges of the anterior rectus sheath were drawn together, if possible.

Dauriac(23) in 1894 and Bacon(2) in 1895 made two vertical muscle bands by splitting the recti longitudinally at each side of the hernial opening. These they cut squarely off at their lower ends and crossing them, sutured the end of each into the bed from which the other had just been removed. They thus had two muscle bands crossing at the center of the rupture opening and uniting the two recti.

Wolkovicz(64) made similar longitudinal muscle bands on each side of the opening, but he cut them through their middle, opposite the center of the hernial opening. He then crossed the bands and sewed the ends together. The result was the same as in the operation just described except that the suture of the muscle bands was over the middle of the ring.

Scatolari (56) cut a muscle band from one rectus muscle and drawing it across the middle of the rupture ring he fixed it in the other rectus muscle by drawing it through the pierced muscle belly.

Salistscheff (54) made two pedunculated muscle flaps, one above and one below the hernial opening, and united them to cover the rupture.

Diaknow(24) and Starkow made one muscle flap below and turned it upward over the hernial opening.

The principle of sewing the different layers of the abdominal wall at right angles was instituted by Biondi(9). He sewed the peritoneum transversely, the muscle vertically, the fascia transversely, and the skin vertically.

During the next period in the development of this operation, fascia-plastic and muscle-plastic operations were combined in varying degrees.

In 1890 Sänger,(55) at Tait's suggestion, made the first attempt at a purely fascia-plastic operation for ventral hernia. He opened the rectus sheath on each side along the edge of the ring and freed both the anterior and posterior layers of the sheath from the muscle for some distance. He then, without sewing the muscles, made

a broad approximation of the inner or muscle surfaces of both the anterior and posterior layers of the sheath by inverting the posterior layer and everting the anterior layer.

Gottschalk(30) in 1900 combined the Gersung method with a modification of the Sänger operation. After incising the posterior rectus sheath, he exposed the muscles, mobilized them freely and sewed them together in the midline. He then approximated widely the inner surfaces of the anterior rectus sheaths as one does in closing the peritoneum by the method of eversion.

Nable(49) devised still another fascia-plastic operation. He closed the peritoneum and then made an incision on each side through the anterior rectus sheath, 1 or 2 cm., lateral, to the edge of the ring. The median part of the anterior rectus sheath thus left attached to the edge of the ring and therefore continuous with the posterior rectus sheath, he inverted over the peritoneum and sutured in the midline. He next mobilized both recti muscles after the method of Gersung and sewed them together. The outer edges of the anterior rectus sheath of the two sides were not united.

Poly(53) used the same operation, but sewed the fascia flaps with the peritoneum instead of separately. He also used tension sutures.

Brenner(13) devised a fascia-plastic operation in which he made two flaps from the anterior rectus sheath like trap-doors, hinging them on the median edges of the hernial ring. These flaps he applied the one over the other, covering the rupture opening with a double layer. No attempt was made to unite the recti muscles.

Bessel-Hagen(6) modified the same operation by turning up a considerable amount of the rectus muscle with each trapdoor flap.

Heinrich(34) made a trap-door flap from the anterior rectus sheath of the right side only and, hinging it at the margin of the ring, he inverted it over the rupture opening and sewed it to the edge of a vertical incision in the left anterior rectus sheath. This latter suture line was reinforced by a second layer of sutures.

Cahen(19) devised an ingenious operation for ventral hernia like Digot's well-known operation for webbed finger, only of course reversed. On the right side he made a vertical incision through the anterior rectus sheath at some distance lateral to the margin of the ring. The median part of the rectus sheath attached to the ring was turned down with the posterior rectus sheath to widen it. He next made a longitudinal incision in the posterior rectus sheath and turned some of it up to widen the flap formed by the anterior rectus sheath. He thus had two wide anterior and posterior fascia flaps.

to draw across the rupture opening. He united them respectively to the anterior and posterior rectus sheath of each side. This operation, of course, could not be used below the semilunar fold of Douglas.

In January, 1899, W. J. Mayo(48) expressed the opinion that in umbilical hernia the recti were usually so far apart that it was not practical to attempt to bring them together. He therefore advised wide lateral or vertical overlapping of the fascia,—a purely fascia-plastic operation. The principle of overlapping from above downward has undoubtedly been one of the greatest advances in the development of this special field of surgery.

The same principle was worked out independently by several men and reported soon after the Mayo article appeared. Piccoli(52) made his report in August, 1899; Bonoma(12) in December, 1899; and Blake(10) in 1900.

Howard A. Kelly(40) in 1910 reported a modification of the Mayo operation consisting of wide lateral incision and freeing of the rectus fascia as far as the outer border of the muscle with very liberal overlapping of the flaps from above downward.

Still another use of the Mayo principle, which I have not found reported, was related to me by Dr. C. N. Smith, of Toledo, Ohio. In operating upon a rather difficult incisional hernia he had closed each end of the rupture but had remaining, at about the middle, a round opening like that of an umbilical hernia, which could not be closed from side to side. He met the difficulty by making lateral incisions and overlapping from above downward, after the Mayo principle.

It will be found that in suitable cases, if the rectus fascia is freed widely from the muscle and lateral incisions made as in the Mayo operation, it will be possible to close the greater part of the vertical incision and then to unite the rest by overlapping from above downward.

Another device of some value is that advocated by Bumm(16) who, after thoroughly mobilizing the anterior rectus sheath, made longitudinal incisions through it on each side to relieve tension as does Langenbeck in his operation for cleft-palate.

In 1903 Pfannenstiel(51) applied the principle so familiar to us in the Pfannenstiel incision to the cure of ventral hernia. He made a transverse incision in the rectus sheath, freed it widely, mobilized the recti muscles, united them in the midline, and closed the fascia transversely.

Judd(37) has recently published a method which is in use in Rochester. After excising the sac of a ventral hernia, the surface

of the anterior rectus fascia is cleared on each side and the whole abdominal wall of one side, exclusive of the skin, is overlapped laterally upon the other. The peritoneum of one side is applied to the anterior rectus sheath of the other. The advantage of this operation is that no difficult and damaging dissection is necessary The operation was first reported by J. A. Blake(11) in 1901 with several successful cases. In some he dissected back the peritoneum and in some he did not.

In 1901 Gangitano(26) reported a principle he had used in operating upon umbilical hernias, which is similar to one reported recently by Beckman(5) for the treatment of femoral and inguinal hernias. He made a rectus incision through the abdomen and after freeing the sac of its contents from the inside, he inverted the sac into the abdomen and, without removing it, sewed through its neck, including the hernial ring in the suture.

Brun(14) reports that Nota of Turin has operated as follows on 244 children since 1890: An elastic cord 30–40 cm. long is passed around the base of the hernia with a curved needle and worked horizontally under the skin. The hernia is then reduced and held in place with the finger while the elastic cord is drawn tight and the neck of the sac obliterated. The ligature cuts through in a few days and comes away in twelve to fifteen days, and a solid cicatrix forms. He has had only one recurrence.

This method relies for its success upon the principle recently advocated that small hernias in children can be cured by simple excision of the sac.

Various foreign materials have been used to aid in the closure of ventral hernias and, in the opinion of its advocates, the wire filigree has made it possible to cure any hernia, no matter how large, if the patient's general condition will permit of the operation.

In 1890 Trendelenburg(61) transplanted bone into an inguinal hernia. Somewhat later F. König(43) used bone with periosteum successfully to close a midline hernia and also suggested the use of periosteum alone.

Recently Kirschner(41) has transplanted free fascia in closing a ventral hernia. John Stage Davis has also shown by careful experimental work that the ultimate results of fascia transplantation are good so far as the permanency of the graft is concerned.

For closing hernias, however, the fascia lata is the only satisfactory fascia and the amount of it available is limited. At present, our attitude is that we may use transplanted pieces of fascia to reinforce doubtful suture lines, but only in emergency may we depend

upon it to close a hernial opening. In the future it may possibly take the place entirely of wire filigree and other foreign materials.

Perforated and gridiron plates of metal or celluloid have been used, but have been discarded for obvious reasons.

The wire filigree is deserving of considerable attention and its use has been developed by Witzel(63), Goepel (29), Bartlett(4), Willy Meyer(62), Phelps, Perry (50), McGavin(45) and others.

Witzel put in cross-wire sutures from side to side and wove them together with longitudinal wires to complete the filigree.

Goepel was the first to use the ready-made wire filigree.

Willard Bartlett(4) deserves probably more credit than any one else for the perfection of the filigree. He showed that the cross wires alone bore most of the strain and that a filigree made with one doubled vertical wire was strong enough, more pliable and less irritating to the tissues. He used 27 gauge wire and placed it between the peritoneum and muscle if possible. The filigree was overlapped for a short distance with firm tissue at the circumference and the mesh fixed in place with a few catgut stitches. Bartlett called attention to the firmness with which it was soon grasped by the ingrowing tissues.

The methods of injecting foreign substances about the rupture ring in the hope of producing a cure have been numerous, but will not be considered in this paper.

Burckhardt,(17) working with small umbilical hernias in children under twelve years, has injected paraffine directly into the inside of the sac. The paraffine is hard with a melting-point of 54° C. and is heated to 65° C. Immediately after the injection of the paraffine, ethyl chloride is sprayed on the skin for half a minute and a flat pad firmly applied with adhesive plaster. The paraffine is supposed to form a cap inside of the abdomen, a sort of internal truss, and to produce adhesions. The hernia must be small, not over 1 cm. in diameter, if the operation is to be done at a single injection. He says that the patients complain of no pain except with the insertion of the needle.

In the treatment of ventral hernias certain general principles are important. There must be careful approximation, if not overlapping, of all fasciæ with special attention that no peritoneum, sac, fat, muscle or scar tissue prevent perfect union. The Condamin method of lateral approach to the edge of the ring has become quite generally employed.

Various means have been used to reduce excessive intra-abdominal pressure. Before operation the rupture is reduced, if possible, and

the abdomen made to become accustomed to the increased pressure. Also free evacuation of the bowels and various means for the reduction of body fat are employed for weeks before operation. At the time of operation free excision of fat from the omentum and from the abdominal wall help to reduce the pressure in the abdomen. After operation the continuous flexion of the thighs and chest upon the abdomen are helpful.

It is agreed that in most cases one must depend upon fascia rather than muscle to close a ventral hernia, but that in certain cases one may employ muscle tissue alone.

The use of bandages after operation is of little value in preventing recurrence; and where a firm pad makes direct pressure over the field of operation they are harmful.

For all ordinary umbilical and ventral hernias the method of closing in layers or the Mayo overlapping operation are not only satisfactory but preferable. The method of overlapping the whole abdominal wall, exclusive of the skin, does away with much dissection and will probably gain in popularity. However, the very large ruptures, either umbilical or ventral, and especially those in the lateral abdominal wall where tissues will not stretch much, are still extremely difficult problems to meet. To successfully treat these cases the various plastic methods reviewed in this paper, especially those dealing with the fascia, are of more or less value in selected cases. Most of the muscle-plastic operations are not available because of the atrophy due to the disturbance of the circulation and nerve supply. More use can undoubtedly be made of the mobilized recti muscles than of the small flaps fashioned from them.

For the very large ruptures in which there has been much loss of tissue by sloughing, it is probable that the wire filigree is often the only possible means of closure.

The transplantation of free fascia for the cure of large ventral hernias has not as yet been thoroughly tested, but it may in time become the method of choice. At present, we can only say that it is probably a valuable means of reinforcing doubtful suture lines.

In children the very large ventral hernias are rare and their cure extremely dangerous. The smaller umbilical hernias, however, can, as a rule, be cured by simple excision of the sac with or without the closure of the ring.

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DISCUSSION.

DR. MILES F. PORTER, Fort Wayne.—There are two or three cardinal points that ought to be kept in mind in connection with the operative cure of hernia. In the first place, preceding all hernias there is a sac formed. No sac, no hernia. One of the things of first importance is to get rid of the sac, and to render that particular peritoneal surface at that point level at least; if we do not bring it together, in such a way as to form a mound, looking from the posterior aspect of the individual, so as to shunt the pressure from inside the abdomen. The next point is, that when your flaps, whatever they are made of, are coaptated, they must be coaptated without tension or you will fail in your results. In the ordinary belly, there is usually considerable room from above downward, little or no room from side to side, and on this actual fact, it seems to me, rests the Mayo and kindred operations. It is seldom we have any trouble in bringing the margins of an umbilical hernia opening together from above downward. The man who is likely to develop a hernia is the man with a pendulous abdomen. His recti muscles are longer than they need to be, but his flat muscles are shortened, therefore in the vast majority of cases approximation can be made from above downward with infinitely less tension than from side to side. One other factor, and that is, all this work must be done not only with aseptic precautions, without infection, but we must get it done with as little handling and mauling of tissues as possible because the tissue we want to leave is tissue of reduced vitality as compared with many other tissues in the body.

With these things borne in mind, personally I have never seen a case of hernia in which I felt at all the necessity for introducing any foreign body in the wound in the way of filigree or a celluloid plate. If we must have additional tissue, it seems to me that we can usually get it from the fascia lata of the thigh or from the fascia some place else, or from fascia which has been kept in cold storage.

DR. H. W. LONGYEAR.—This is a mechanical question entirely and we should consider it as such.

I read a paper on closing of the abdominal incision during the earlier history of this association, and I wrote and asked for the opinion of a great many eminent men in abdominal surgery at that time, asking them as to the occurrence of hernia after operation, and it was interesting to notice at that time the number of men of eminence who believed that union of muscle had anything to do with it. A great many thought that nonunion of muscular tissue was the cause of postoperative hernia. I believe we ought to forget muscle entirely in this matter. It is only the tough, nonelastic tissue, the fascia, we must depend upon. If we think of curing the hernia by uniting muscle we will fail every time. The muscle is only of use as a buttress on top of well-united fascia, and is of no other use in my experience.

DR. WALTER C. G. KIRCHNER, Saint Louis.—I think the paper calls attention to a very important subject, and when a hernia has been present for some time we must consider the intraabdominal pressure. For instance, I have found it advisable in those cases to put patients to rest for a certain period, after the hernia has been reduced, so that at the time of operation the tension is less. In my experience the overlapping method from above down, the so-called Mayo method, has been of great service when the hernias are small, but in the cases where the hernias were large, the results were not so good. Especially was this true in those cases in which we had much fat in the abdominal wall, and in which cases the muscle is usually attenuated. I have found that the mattress sutures used in this overlapping method from above down, would occasionally as a result of this tension cause numerous pockets to form, and instead of a large hernia we would have a number of smaller ones. So I believe in these cases, where the abdomen is very flabby and abdominal tension great, more is to be accomplished by the use of some of the other methods the doctor described, which permit an enlarging of the abdominal cavity.

DR. J. H. CARSTENS, Detroit.—I want to say a word or two with reference to abdominal umbilical hernias. The distinctive feature of these umbilical hernias is obesity, and that is one reason why they will not unite very well. The first great thing is to put the patient on preliminary treatment and reduce the fat and develop the abdominal muscles and abdominal fascia by proper physical exercise, and when you do that for three months or six months and get the patient in a good physical condition, so that you can unite fascia to fascia and muscle to muscle, without uniting fat to fascia and fat to muscle, and getting it all mixed up, you will have better results than you will have by operating on every case that comes along without preparation.

DR. ROBERT T. MORRIS, New York City.—There is one simple procedure concerning which I can give no accurate report. At various times during the past twenty years, in fleshy patients with fatty change in the abdominal wall, I have simply opened the sac, obliterated the smaller lesser sacs and have then put in a purse string suture, following it sometimes with another, I get the right degree of constriction for closing the opening, and doing nothing more except-

ing to brush the interior of the sac with carbolic acid—not excising it. This is done in the expectation of having hyperplastic tissue, added to the mass of constricted sac. I have asked these patients to return and have said to them, we shall probably have a return of the hernia. When the hernia returns, then we shall have gained something and you will be in a better condition for a neater operation. None of these patients have returned for operation, and my natural deduction has been they were so displeased with the result that they went to another doctor. (Laughter.) Speaking seriously, I do know that some of them remained well for years.

DR. THOMAS B. NOBLE, Indianapolis.—This is a matter of so much importance that I am disposed to take a little of your time to discuss it.

Dr. Porter referred to the necessity of asepsis, and Dr. Carstens has referred to the necessity for elimination of fat. Both of these points are of the greatest importance. The element of primary union depends upon the elimination of infection and careful handling of tissue. This can be avoided, not as I used to do it, by opening the sac, making my dissection from above downward and getting into the sac primarily, but simply at once amputating the sac by cutting around the hernia and holding to the sac, the sac becoming a handhold and confining my manipulation and handling of tissue very largely to this portion of skin and sac that is going to be eliminated, and by cutting around the base of the sac, then the skin is cut back carefully, and at once we will come upon the aponeurotic fascia. There being little or no fat, following the fascia down, we can peel away the fat with perfect definiteness, so that when we come to overlap the fascia below and transversely the internal oblique and peritoneum come next in place, these can be brought together, overlapping without any intervening fat substance between the two plates whatever, and with but very little handling of the tissue.

Next, a matter of importance is that the line of union shall remain fixed or splinted, if you please, as the patient moves in bed. If we can devise a way in which we can fix the surfaces and keep them perfectly at rest, we are going to do much toward insuring a prompt union of these surfaces. We have been able to accomplish this. The plates having been sutured by chromic catgut, beginning back well on the side of the abdomen, 6 or 8 inches away, we carry a heavy silver wire down through the plates we have united and out, and fasten them with gauze buttons on the abdomen to the sides. Two or three of such sutures as these will fix and immobilize these broad surfaces and the method has been of decided benefit in effecting a prompt and immediate union.

DR. SMEAD (closing the discussion).—I had some hesitancy in bringing a paper of this kind before this association, but my reason for doing so was that in large ventral hernias no one method will meet all cases, and, it therefore seemed to me, if we had all of these methods well in mind, some of them might be valuable in treating individual cases.

In an enormous ventral hernia I had recently to deal with, I

applied the Heinrich method of making a trap-door flap, as it seemed at the time the only thing I could do. It is a little less than a year now since I did the operation and so far it has held securely.

It was my hope that someone would take up the question of fascia transplantation. It is quite a new field, and at present we can only use it in emergency to close a hernial opening or to reinforce a doubtful suture line.

I wanted to speak a little further of the operation, for which I give Dr. Smith credit in my paper. Dr. Smith had closed each end of a ventral hernia but could not close the middle point. He had left practically an umbilical hernia. He made incisions laterally and closed the opening as if it were an umbilical hernia.

As to the suggestion made by Dr. Morris, the nearest operation I have found to the one he has mentioned is that of Lexer. He uses a circular purse string wire suture, drawing the ring together, and entirely closing it.

Dr. Noble's operation combines several principles and among them the Condamin method of approaching the ring. The tension suture which he described was originally described by Goldspohn of Chicago.

NOTES ON ADVENTITIOUS TISSUES OF THE ABDOMINAL CAVITY.

BY

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(With Three Illustrations.)

ABOUT twelve years ago I began to be impressed with the significance of adhesions of insidious formation in the cephalad part of the peritoneal cavity. These were spoken of for purposes of forming a concrete mental picture as "cob-webs in the attic of the abdomen."

The first paper upon the subject was published in the *New York Medical Record* for December 26, 1903, under the title "Intestinal Fermentation as it Interests the Surgeon." The subject gradually enlarged under observation, and my points of view changed from time to time, finally including the idea that adhesions in the attic of the abdomen were of two types—one relating chiefly to connective tissues, and the other relating chiefly to endothelial tissues.

The first group included defects of embryonic character which remained as peritoneal structures when there was failure of complete normal absorption of apposed peritoneal surfaces in the fetus. Some of these structures become much enlarged under the influence of stress in cases of visceral ptosis.

The other group of adventitious tissues of the upper abdominal sort occurs as a result of toxic injury to endothelial cells. Toxins which cause this injury to endothelial cells appear to be of two sorts—the ones which make their way through walls of the bowel and bile-ducts, and toxins which are formed by bacteria (colon bacilli and anaërobes) existing in the free peritoneal cavity, under conditions which are of frequent occurrence in this era of physical decline belonging to our cultural period. Such response of cell protoplasm to toxins which do not cause actual inflammation may be allergic in character.

In the same year in which my first paper upon the subject was published Mr. W. Arbuthnot Lane published (*Lancet*, vol. i, 1903, p. 153) his paper entitled "Chronic Obstruction of the Cecum and

Ascending Colon," and from that time began his dissertation and evolution of ideas in connection with adventitious tissues within the abdomen, and their relation to insidious toxic influences. Apparently we began to write upon the same subject in the same year, but using different fields in the abdominal cavity for our respective observations. The matter of priority in publication is of little consequence in this instance and has no significance beyond the fact that toxic influences of similar character were recognized by two surgeons simultaneously.

Mr. Lane's ideas received general recognition first, but he tells me that as great difficulty was found in engaging the attention of the profession in his country as I had encountered here. In both countries our views met about the same sort of opposition, which is natural and desirable in a conservative profession, for purposes of correcting errors belonging to theories which may be fanciful.

So far as I know Dr. Musser of Philadelphia was my only active champion in this country from the first, in connection with the subject of adventitious tissues within the abdominal cavity and their relation to insidious toxic influences.

In 1909 Jackson came forward with his description of the membrane which carries his name.

In 1853 Virchow described adventitious tissues, or abnormal development of membranes within the peritoneal cavity, and speculated on their significance, but in his day the subject of intestinal toxemia had not been developed and the observations of Virchow were passed by without further elaboration by members of the profession.

At the present time we may perhaps condense the entire subject in the form in which it was arranged in relation to "attic adhesions."

(1) A number of embryonic remnants undergo evolutionary change and serve a mechanical purpose, under the influence of stress belonging to visceral ptoses which are characteristic of the neurasthenic condition common to this part of our cultural period. Some of the hypertrophic remnants exert malign influence.

(2) Toxins which develop in excess from bowel bacteria and which cause a lessening of efficiency of ductless glands in patients of neurasthenic habit (and in some others) injure endothelial cells of various parts of the peritoneum. The plastic exudate which follows this toxic injury results in the formation of adhesion tissue. Toxins likewise influence the connective tissues of normal peritoneal supports, resulting in a fibrinous deposit and connective-tissue hyperplasia similar to that of Dupuytren's contraction of the palmar fascia (also of toxic origin).

Toxins may or may not influence both the connective-tissue cells and the endothelial cells of embryonic-relic structures. In some cases of Jackson's membrane we find new inflammatory products at points of greatest stress; in other cases of Jackson's membrane we find no evidence of an irritative process of any sort.

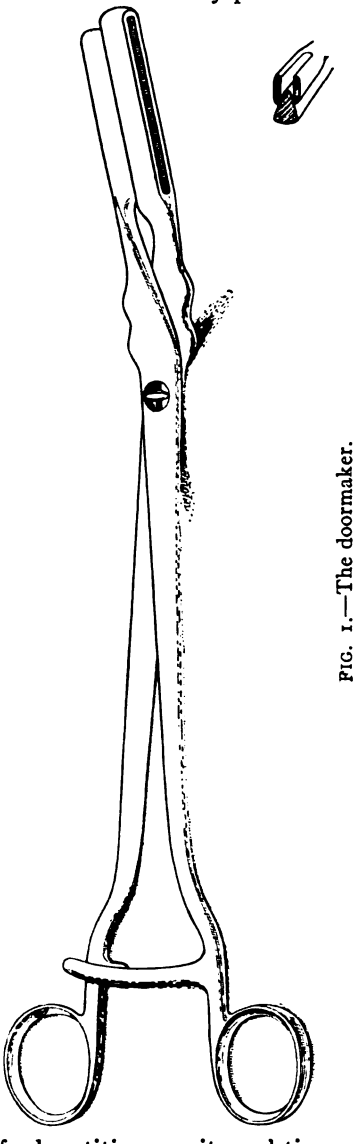

FIG. 1.—The doormaker.

The question which interests surgeons relates to work which must be done when medical treatment has failed to give relief to the patients who are suffering from the effects of adventitious abdominal tissues. This medical treatment belongs to the newer knowledge of the twentieth century, and includes a study of all those influences which are exerted upon the individual patient in such a way as to allow the development of various species of intestinal bacteria in excess. Medical treatment includes also an elaborate and thorough study of such hygienic measures as are required for maintaining the physical well-being of any given patient.

In olden times it was a rule in surgery to get the patient into good condition before doing a surgical operation, if possible. We later changed to the idea of doing a surgical operation in order to allow the patient to be put in good condition. These two positions representing extremes are to be supplanted by a mean position in relation to the surgery of adventitious peritoneal tissues.

In cases in which the patient does not progress rapidly enough toward health under medical and hygienic resources, the physician is to avail himself of the resources of the surgeon. Surgery in these

cases is of temporary benefit only unless the internist keeps any given case well in hand. The methods of the internist are of temporary service only unless he asks the surgeon to relieve the patient from sources of irritation which are found to be persistent.

The earlier surgery relating to toxic processes of intestinal origin was unduly severe, and in the course of my own operative work a rather simple surgical procedure has been adopted for short-circuiting the bowel and throwing most of the colon with its toxins out of commission. Once in a while it is desirable to suspend or to remove the colon, to separate extensive Jackson's membrane, or to divide the adventitious tissue of a Lane kink, but for the most part we may

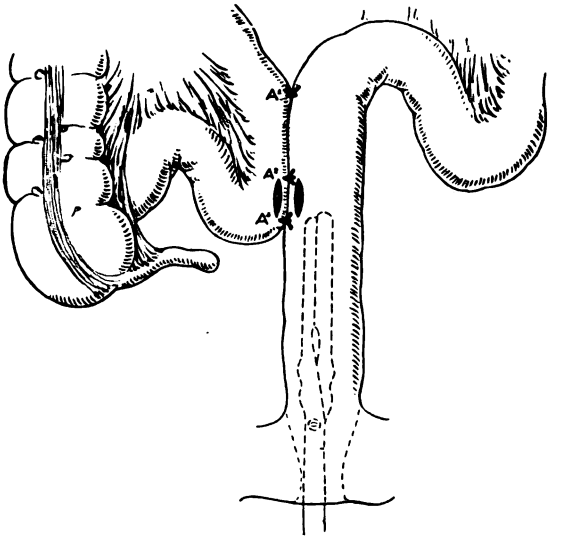

FIG. 2.—*A* 1, 2, 3, sutures which are introduced to prevent leakage before the wedge jaw is thrust through slits in ileum and sigmoid. Dotted lines show the doormaker ready to be opened by an assistant.

accomplish all that is desired by short-circuiting the bowel by a procedure which keeps the patient in bed hardly more than ten days in the average case.

This procedure consists in making a small median abdominal incision long enough to allow us to bring up a loop of ileum and a loop of sigmoid. The parts chosen are ileum a few inches away from the cecum and sigmoid a few inches above the rectum. An instrument which is here presented and which has been named the "doormaker" is passed into the rectum, a fold of gauze having been wrapped around the handles to prevent mucous membrane of the

rectum from slipping between the arms of the handles. This loose sleeve of gauze is held in place with an ordinary rubber band slipped over the depressions which are made for that purpose in the blades. The wedge-shaped blade of the doormaker is thrust through the wall of the sigmoid and through the wall of the ileum. When the jaws are snapped together the wedge-shaped jaw crowds bowel wall into the fenestrated jaw and cuts off its circulation. Before thrusting the wedge-shaped jaw through the two bowel walls, three sutures are placed as shown in Fig. 1 to prevent leakage. When the jaws of the instrument are snapped together, three corresponding sutures are introduced at the points at which they are seen to be needed.

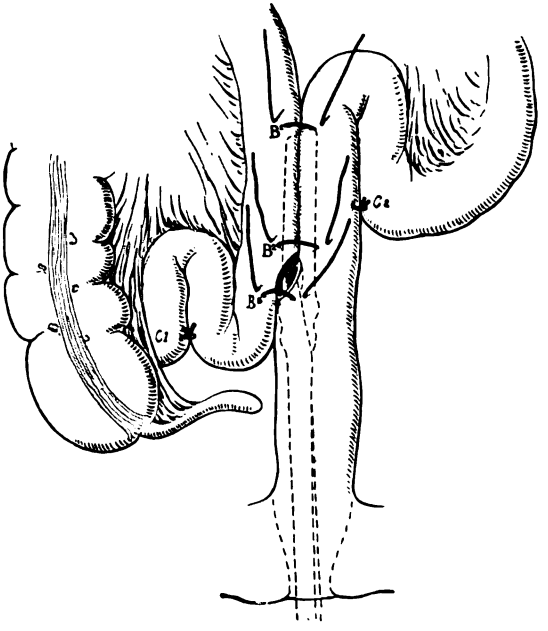

FIG. 3.—Doormaker in place and jaws closed. *B* 1, 2, 3, final row of sutures to prevent leakage, *C* 1, angulation suture for ileum; *C* 2, angulation suture for sigmoid.

The next step has for its object the shunting of ileal contents through the doorway. In order to facilitate this process the ileum is angulated and held with a single suture, as shown in Fig. 3. In order to prevent reversed peristalsis from carrying contents of the rectum back into the colon the sigmoid is angulated and maintained in this position by a single suture (shown also in Fig 3). At points of introduction of the angulation sutures the peritoneum is scarified in order to ensure local adhesions.

The abdominal wall is closed and the handles of the doormaker protruding from the rectum are supported with a strip of rubber plaster fastened to the thigh of the patient.

This instrument will cut its way through the bowel walls in from two to four days, and is then removed. It avoids the hemorrhage and soiling of peritoneum that go with older operations. It makes a door 2 1/2 inches long between ileum and sigmoid as soon as the devitalized tissue in the grasp of the jaws has become broken down by digestive or by saprophytic processes.

Some patients complain about the presence of the instrument in the rectum. This complaint is avoided if the sphincter ani is stretched moderately. Patients will complain about the frequent bowel movements, amounting sometimes to ten in the course of a day when contents of the ileum are first thrown directly upon an unaccustomed mucous membrane of the rectum. This mucous membrane may become irritated. Starch enemas promptly allay such irritation. At the end of a week or two, bowel movements commonly drop down to three per day, and after that are apt to occur from one to three times daily.

In these notes reference is not made in detail to my work with attic adhesions, which has been described elsewhere. Attic adhesions are so potent a factor in causing interference with motility of the pylorus, duodenum and hepatic flexure of the colon that they must be taken into consideration by surgeons who are dealing with the factors of disturbance described by Lane and by Jackson, otherwise there will be too many "unsatisfactory cases." All of this work which relates to adventitious tissues within the abdominal cavity is to open entirely new vistas in general medicine. Many cases of neuritis, neuralgia, psychosis, headache, "rheumatism," colitis, cholecystitis, diabetes, arterio-sclerosis, and in fact a long list of cases that were formerly held to belong to the internist only, are now to become joint charges of surgeon and internist. We are to have more and more demonstration of those toxic influences which depend upon intestinal bacteria, because the physical decline which goes with our response to the gregarious instinct will become more and more marked in all civilized countries as time goes on.

DISCUSSION ON THE PAPER OF DR. MORRIS.

DR. G. VAN AMBER BROWN, Detroit.—The particular point I wish to bring out is in regard to the etiology of these cases; is it due to visceral intoxications, that is, inflammatory changes, that we have these distortions, or are they due to certain mechanical interferences?

If we study the course of the lymphatics we find that the flow of lymph is from the intestinal wall, and if changes are not produced in the lymphatics, it would lead us to believe they are not toxic. If we look to the circulation we find the blood-vessels in the course of these peritoneal bands are linear. They are not such as we find in ordinary inflammatory disturbances. The appendix is said to be a frequent cause of this trouble, and yet so often we find in the so-called Lane's kink or Jacksonion membrane that the appendix is perfectly free. It is not only free, but is normal in every respect. Gray and Anderson who have studied this have come to the conclusion that the Lane kink is due to the folding or rotation of the viscera which takes place in the early part of life. The cecum, for instance, in dropping down back of the peritoneum twists it in such a way as to produce these tugging bands. Where we find the Jackson membrane, the omentum, instead of extending only across the transverse part of the colon, descends far down upon the ascending colon into the region of the cecum, that is apparently what Jackson has described, simply this omentum extending farther down along the colon than is usual. Mayo believes these distortions to be purely mechanical, the result of faulty embryonal development; it seems to me that instead of the viscera tugging on the peritoneum and producing these bands, really what takes place is that the bands by tugging on the viscera produce the ptosis.

As to the treatment we find that these peritoneal coverings are not tight upon the intestinal tract but are freely movable and by simply incising the peritoneum we are able to replace it in such a way as to get rid of this tension and to cover over portions that have been denuded. Sometimes though this cannot be done, and the thing to do then is an ileosigmoidoscopy, as Dr. Morris suggests.

DR. EMERY MARVEL, Atlantic City.—Whenever Dr. Morris presents a subject he calls our attention to something that is new, and I am sure that others have listened to his contribution with as much interest as I have. Whenever he presents a paper he stimulates us to think. Whether we think with him or against him, it is immaterial. As a student of Dr. Morris I have been inclined mostly to think with him.

As regards the causes operating to produce this stasis, or delayed circulation in the intestinal tract, I am inclined to think that Dr. Morris has offered a very feasible explanation.

As to the operation, I want to make one or two comments. As to its uniqueness, no one can doubt. As to its simplicity, it appeals to us. As to whether it brings about the result which is aimed at, I am in doubt. It is open to objections to my way of reasoning. The short-circuiting from the ileum direct into the sigmoid is objected to because it will not permit the individual in which this short circuiting is done to properly assimilate his or her nutrition. I should fear a persistent diarrhea, in which ingested food would pass out before assimilation took place. The colon is the absorptive part of the bowel, as I understand it, and when we have a fecal fistula, and it is from the ileum through the abdominal wall, it is not likely to close and

the nutrition of the patient is defeated. This is a matter which appeals to me for consideration and warrants proof to the contrary before I should practice the operation.

A second point is this: are we going to get away from the bacterial theory operating as described by Dr. Morris? When we leave the transverse and ascending colon open with moisture and some food getting into it, are we not presenting that patient with the most prolific breeding place that it is possible for her to have? We would have deprived that patient of the rapid current to drain that very space and induced increased stosis. That, it seems to me, is worthy of some consideration and needs to be studied.

A third point is putting an unnatural opening into a tube that has a natural course and not defeating the natural course while that communication is open. In a gastroenterostomy, the opening is likely to close when the pylorus becomes sufficiently patulous for the natural current.

These comments, it seems to me, are worthy of some consideration before one adopts this operation described by Dr. Morris.

DR. THOMAS B. NOBLE, Indianapolis.—I wish to relate my experiences along this line. They have been of exceeding interest to me, and I am doubly interested in the report made by such an observer as Dr. Morris.

I have been, in a way, experimenting relative to methods of overcoming faulty colonic drainage, and I am getting away from colonopexy entirely, and am more and more leaning toward short-circuiting. I have a young woman in the hospital at present who had this operation done. Another young woman has gained thirty pounds in the last six months after having had exactly this type of operation. She had a dilated kink, a faulty colon, with a chronic mucous colitis. This operation was done upon a doctor's wife eight months ago, who has improved in her general physical welfare. Her condition was one of chronic mucous colitis, with bad colonic drainage, the result of an ovariotomy done by a member of this association a number of years ago in the old way of *en masse* ligation, which was followed by exudation and pelvic adhesions which bound down the head of the colon, omentum and sigmoid in the pelvis and produced distinct colonic interference.

I am pleased so far with the clinical results of short-circuiting. I have not, of course, done such an operation as Dr. Morris has described, nor is the technic of my work at all that of Dr. Morris. It requires, as I have timed it, eight to twelve minutes to do a 3-inch anastomosis here. The incision in the head of the colon goes clear down to the appendiceal attachment which is removed, so that there is no pocket or eddy left in the intestinal current at the most dependent portion of the head of the colon.

There occurs to me a matter relative to the method of Dr. Morris that I think also important, and that is the danger that may arise from the foramen produced by the union between the sigmoid and head of the colon and mesentery. There is by such a method as Dr. Morris has adopted such a foramen formed there, which, it seems to

me, might become dangerous if a few coils of small intestine should slip underneath and become distended, and become obstructed. I do not know about that. I have not allowed such a foramen to remain in my cases, but have obliterated it by sutures from the mesenteric part up to the line of anastomosis.

DR. WALTER C. G. KIRCHNER, St. Louis.—Those who were present yesterday will remember I showed a picture of obstruction of the bowels due to kinks, and Dr. Morris' remarks have been directed to that phase of obstruction. You will remember the ascending colon and cecum were covered by a membrane, and kinks were present in the hepatic and splenic flexure, and with a sagging of the transverse colon a complete obstruction had resulted. All of this, I think, was the result of the process explained by Dr. Morris.

In regard to the treatment of the condition a number of points have been brought out. In reference to the nutrition, in the experience we have had where the colon was entirely excluded, we found that the colon was not nearly so valuable to the economy as we had supposed, and I can recall quite a number of cases in which total exclusion of the colon had been made and the nutrition seemed but little if at all impaired. In the operation that Dr. Morris has explained we have a lateral anastomosis, and we also have the loop or foramen Dr. Noble has described. I think these two features should be considered in regard to the technic. There is danger of obstruction and such cases have been reported. There is this to be said in regard to anastomosis. It has been found that end-to-end anastomosis is a very much better procedure than lateral anastomosis, as far as intestinal function is concerned, that is, the peristaltic wave passes more rapidly with end-to-end anastomosis than when lateral anastomosis has been made.

However, I believe the operation suggested by Dr. Morris is better than the suspension operation and is a rational procedure.

DR. E. GUSTAV ZINKE, Cincinnati.—Before Dr. Morris closes the discussion, I would like to ask a question with reference to the retention ability of the fecal contents after operation.

DR. MORRIS (closing the discussion).—With reference to the remarks made by Dr. Brown, he noted a point I made in regard to the embryonic character of these tissues. The omental remains simply belong with a number of other embryonic relics which are left over and increase, under the influence of mechanical stress or toxic impression, as the case may be.

With regard to the actual results, practically all of my patients who have been subjected to this operation or to a similar process have gained from 5 to 35 pounds in the course of three or four months but some have not been made comfortable. The reason I am not reporting a number of these cases is that my operative work is in a process of evolution still. I began by joining the sigmoid to the ileum or the sigmoid and cecum, and have done so many varying operations that it is not yet time to make a report upon later operations that I have chosen to make during the past year. Two of the patients operated upon in June wrote me this month. Both of them

are pleased. One has gained 20 pounds, while the other has gained much in weight and says she never felt so well in her life. She had a chronic prolapse of the bowel, the transverse colon, for years. She had not been able to dance for years. Sometimes I do Dr. Longyear's operation in addition to suspending the transverse colon away above the omentum. I began with the hammock operation of Coffey. It is useful in selected cases.

Dr. Marvel thinks that unless we defeat the natural course of the bowel contents the opening will gradually close. That is true, I have sought to give sufficient angulation and fixity of the sutured angulation to make permanent valves above and below in order to defeat that natural course and at the same time not cause intestinal obstruction.

Dr. Noble speaks about the foramen which is left after bowel junction has been made and the danger of obstruction. I have been aware of that. This foramen is large, however. I have had patients make an effort at sudden coughing or vomiting during an operation. The patient has sometimes forced her ileum down through the foramen and my impression is this foramen is so large that peristaltic progression will carry the bowel back and forth as I have seen it do in the course of an operation. If the patient becomes pregnant, the uterus would probably rise anterior to the point of anastomosis, but that I do not know. The Lane anastomosis is not so very different. We assume the uterus will naturally rise anteriorly to the point of anastomosis.

Dr. Kirchner speaks about the matter of kinking the bowel. By making this artificial kink, suturing it with two or three sutures, we can retain the two limbs of the ileum and the two limbs of the sigmoid in their respective positions. The permanent kink does not seem to cause trouble. Should it do that, I would unkink the kink by putting the patient in the Trendelenburg position perhaps. I have been called several times in consultation in cases in which the patients had angulation of the bowel at some point of inflammatory adhesion, and have been called to operate in cases of postoperative intestinal obstruction a number of times. I have simply put these patients up in the Trendelenburg position and changed the posture, giving them light massage, and the violent peristaltic movement has ceased and relief has been afforded at once without need for operation in some of these cases.

In regard to the disposition of contents of the ileum, the patient may have from three to ten movements a day for the first few days. They will gradually drop down to about three. They will remain at from one to three movements a day after that. That is the common history.

An instrument in the rectum is a very annoying thing, but if we stretch the sphincter before its introduction, we do away with that. These are practical points in connection with the work.

CHOLANGITIS AND PANCREATIC LYMPHANGITIS.

BY
L. W. SWOPE, M. D.,
Pittsburg, Pa.

ANY operator doing surgery of the upper abdomen is sure to encounter a considerable number of cases in which the diagnosis, based on the resemblance of symptoms and clinical signs of the text-book description of certain diseases, is proved wrong at operation.

My experience in operating for gall-bladder, stomach, duodenal and pancreatic diseases has furnished me with a long list of mistaken diagnoses. In none of these cases has the mistake been followed by such happy results as in operations undertaken for supposed carcinoma of the head of the pancreas. The symptoms and physical signs justified the diagnosis of cancer, and the enlargement of the head of the pancreas found at operation simulated such a condition. Permanent recovery following free drainage of the biliary and pancreatic systems falsified a supposedly certain diagnosis.

In my early cases I was astonished to see patients recover to whom I had given a hopeless prognosis after operations undertaken for relief of symptoms resulting from jaundice. Reference to the literature demonstrates how common was such experience before chronic pancreatitis was a definitely recognized disease.

At present we hope for the possibility of a given case not being malignant, and it is interesting to note Moynihan's reference to pancreatitis in his "Address in Surgery" at the last meeting of the British Medical Association at Brighton. He said: "Its mimicry of carcinoma may be complete."

Painlessly and progressively the patient may develop jaundice, which continues to deepen until the "black jaundice" of the older writers can be recognized. There is great loss of weight and prostration, hebetude and misery, though often the appetite is unimpaired. The liver enlarges and the gall-bladder distends to a degree which allows it to be easily seen and felt protruding below the rib margin. In accordance with the law of Courvoisier, we assume that such a dilation of the gall-bladder is due to causes other than stone. An examination of the stools might show a complete absence of bile pigment and this may seem the most conclusive evidence of carci-

noma, for a chronic inflammation, however inveterate, rarely causes an absolutely impermeable block to the passage of bile.

Autopsy findings are, to say the least, misleading. Cases treated medically persist for such a time that the deposit of fibrous tissue becomes so marked as to make it impossible to understand how operation of any kind could cause even relief, not to mention cure, yet we know by practical experience that in the early stages of pancreatitis recovery follows operation.

As Deaver has frequently pointed out, that fibrous tissue becomes absorbed is unlikely, if not impossible. Therefore, we are driven to one of two hypotheses to explain recovery after operation in these cases; first, the process is arrested and sufficient pancreatic tissue is left to continue the normal function. This is undoubtedly true to a certain extent, but cannot explain the diminution in the size of the head of the pancreas, including with it disappearance of jaundice, which is known to occur after operation.

At autopsy on patients who die after operation, the result of postoperative and postmortem changes (which occur very rapidly in the pancreas) is such that definite conclusions of the pathology of the disease cannot be drawn. This was the case in my three deaths which occurred, one in two, two in three days respectively after operation. The most noticeable feature in these cases was the diminution in the size of the head of the pancreas, which has been markedly enlarged at the time of operation. This lessening of bulk surely could not have been due to absorption of connective tissue so soon after operation. Consequently, as an alternative, we must adopt some other hypothesis to account for this phenomenon. May we not consider that the enlargement of the head of the pancreas is due to causes other than the interstitial deposit of fibrous tissue? There is one form of inflammation which would seem to account for the fact that early cases are amenable to surgical treatment, which, however, becomes only palliative in the later stages, after deposition of fibrous tissue has occurred. This form of inflammation has been called by Deaver "Pancreatic Lymphangitis," and is probably a primary inflammation of the lymphatic vessels, which traverse the interlobular connective tissue of the pancreas.

Theoretically, the anatomy of the lymphatics and the history (early and late) of these cases seem to support this view, but from the nature of things proof is difficult and is not as yet forthcoming.

I wish to record my cases and with them my belief in the occurrence of a definite pancreatic lymphangitis, although it must be admitted

at the same time that there are still missing many links to complete the chain of evidence.

The following brief description of the lymphatics of the pancreas and their relation to surrounding structures is taken directly from the various reports by Bartels in his valuable work on this subject.

The lymph vessels of the pancreas form richly interwoven networks in the interstitial connective tissue. The islands of Langerhans have no relation to the lymph-vessel system, an explanation of the absence or late appearance of glycosuria in interstitial pancreatitis of the interlobular type.

The main lymph vessels emerging from the substance of the pancreas run to one of four groups of lymph glands, named according to their position, left, superior, right and inferior.

1. The left group, known as the pancreatico-splenic, receive the vessels from the tail of the gland.

2. The superior group receive vessels from the upper part of the body and head of the pancreas and communicate with the superior gastric and hepatic lymph glands.

3. The right group, situated between the duodenum and the head of the pancreas, receive vessels from both the duodenum and the head of the pancreas, and running into this group are also larger vessels representing direct anastomoses between the duodenal and pancreatic lymph vessels. The pancreas and duodenum are thus bound together partly through direct anastomosis and partly indirectly by interlacing of branches of the larger stems.

4. The inferior group of efferent pancreatic lymph vessels run particularly to the periaortic glands, but also to a small group below the inferior border of the pancreas, and to the mesenteric and mesocolic glands as well.

All these glands receive tributaries from corresponding portions of the pancreas and some get branches from the duodenum, liver, stomach and spleen. There is a general anastomosis of vessels running from a given organ to the nearest group of glands, and in addition, around the pancreas, there is a net-like anastomosis between the pancreatic lymph vessels and those of the duodenum, portal region, mesocolon and mesentery.

The significance of the lymphatic relation of the pancreas is summed up as follows by Bartels: "The lymphatic communications demonstrated by me make possible an understanding of certain cases of pancreas disease (chronic interstitial pancreatitis) in that it comes into consideration as a port of entry for infection."

For my purpose in this paper we need only consider the lymphatic

relations of the right and superior group of glands, and in these two positions we see a "port of entry" for infection from the points of greatest frequency of infection in the upper abdomen, namely, the biliary system, the stomach and the duodenum. And here, as an interesting and partly confirmatory piece of evidence, may be noted another fact emphasized by Deaver, that the head of the pancreas is the site of pathological changes and swelling, and the rest of the gland shows little or no change until the disease is well advanced. These two facts, limitation of disease to the head of the pancreas, and direct relation of the head of the pancreas to surrounding frequently infected areas, are readily understandable on the supposition that infection reaches the pancreas through the lymphatics, and would consequently be limited for a considerable time to the region supplied or drained by the lymphatic vessels communicating with the infective area. Involvement of the head of pancreas by direct extension up the duct, does not explain why the head suffers so markedly while the rest of the gland escapes involvement until late in the disease.

The postmortem findings in chronic interstitial pancreatitis are too well known to need description. The cases that come to autopsy are always those of long standing, consequently, although we should not in any way attempt to belittle the well-known work of Opie and others, the fact remains that it is at the operating-table that the pathology of the early stages of interstitial pancreatitis must be studied, and it is on the result of this study that treatment must be based.

Since Mayo Robson first caused to be generally recognized the importance of examining the head of the pancreas in every upper abdominal operation, innumerable papers have been written on the subject, but comparatively little advance has been made in our knowledge of the early changes in the interstitial type of infection. But reasoning by analogy, if free drainage cures the condition, and we know that it does, the inflammatory process has not gone on to deposition of fibrous tissue, otherwise complete subsidence of the tumor and relief of symptoms would not result; the best to be hoped for is an arrest of advancement. Therefore, it seems to me, although unfortunately I have no sections to prove it, that the inflammatory process in the early stages is represented by a lymphangitis, and certainly treatment based on this supposition gives most encouraging results.

I do not mean to assert that every case of chronic interstitial pancreatitis begins as a lymphangitis, because there are numerous

well-authenticated instances of involvement through the ducts, the blood-vessels and by direct extension from neighboring organs, but my contention is that in those cases starting painlessly with jaundice, which at operation show nonmalignant enlargement of the head of the pancreas, the most likely exciting cause is lymphangitis.

The symptoms of the cases under consideration may briefly be discussed, and in the main are those usually attributed to carcinoma of the head of the pancreas.

Jaundice appearing painlessly and showing continual deepening, without any tendency to remission, is the earliest and most characteristic symptom of these cases. The cause of the jaundice may be obstruction, cholangitis, or probably both. The infection of the head of the pancreas may arise in any of the surrounding viscera, but more particularly in the duodenum or biliary system. Enlargement of the head of the pancreas in those cases in which the common duct passes through, and not behind, the head of the gland, will cause obstruction to the flow of bile, which causes jaundice or increases that already present. From this time on a vicious circle is established, the obstruction of the common duct causing jaundice and probably infection, and this in its turn continuing the infection in the pancreas by means of the lymphatics. The subjective symptoms of jaundice are constant accompaniments, and with progressive loss of weight and strength, and digestive disturbances, make up the symptomatology of these cases. Pain of an indefinite character is a fairly constant symptom, but one on which very little dependence can be placed in diagnosis.

The physical signs are usually limited to jaundice and palpable enlargement of the gall-bladder. At times, but very rarely (never in my experience) the head of the pancreas may be palpated. This is possible only in very thin patients with relaxed abdominal walls.

Even the laboratory findings are not characteristic. The changes in the feces are those due to absence of bile and pancreatic juice. This accounts for the increase in the percentage of unabsorbed fat in the feces, and also for the variation in the relation between neutral and split fats. My own experience with these laboratory findings is too limited to permit me to offer any authoritative opinion on their value.

Cammidge's reaction has always been a disappointment to me and I must number myself among those who deny any specific significance to a test devised by a man who has done a great deal of valuable work in clinical pathology.

The absence of glycosuria is another point in favor of a lymphatic

infection when it would be expected that the islands of Langerhaas would escape involvement.

Diagnosis.—In spite of the statements that carcinoma of the head of the pancreas can be differentiated from other causes of obstructive jaundice by the presence or absence of stercobilin in the feces, my experience is that the cases I am discussing begin and progress clinically as cases of carcinoma and very frequently cause just as absolute obstruction of the common duct. The obstruction in early cases of cancer is not absolute. Consequently my own opinion is that the differential diagnosis is not certain until the abdomen is opened and the pancreas explored, and even then in many cases only the result of the operation (or autopsy in the event of death) can clear up the diagnosis.

Treatment.—Under these circumstances I believe I am justified in advising operation in all cases of jaundice of obscure origin. When involvement of the pancreas is found the form of operation varies to meet the condition of the organs and the views of the individual operator. The object aimed at is overcoming the infection, which will be followed by subsidence of pancreatic swelling and restoration of free outflow of bile.

To obtain these results Moynihan is a firm believer in permanent drainage of the biliary system by anastomosis of the gall-bladder to the duodenum or stomach. His results show, that in his hands, at least, this is a safe and satisfactory procedure. In my own cases I have been accustomed to draining the gall-bladder, the common duct and the retropancreatic space, through the abdominal wall.

My results, eighteen recoveries in twenty-one operations, make me hesitate to adopt the more serious procedure of gall-bladder anastomosis, although I am convinced that the latter is a most satisfactory procedure.

In operating on these cases, after determining that the cause of obstruction is in the head of the pancreas, I mobilize the duodenum to get free access to the retropancreatic space, which I drain through the abdominal wound. In this way the lymphatic connections between the duodenum and pancreas are broken up and freely drained and further infection from the duodenum is prevented.

Then I drain both the gall-bladder and common duct through the abdomen and leave the tubes in at least two weeks, whenever possible. In this way the biliary system is relieved of congestion and infection, which might reach the pancreas through its lymphatics.

I am perfectly well aware that these operative procedures are claimed to cure because they drain the bile ducts and prevent in-

fection of the pancreatic duct by direct extension from the common duct and duodenum. This has to be considered a factor in certain cases, but in the class under discussion I have given my reasons for believing that the lymphatic system of the pancreas is the chief factor in the occurrence of the interstitial swelling.

DISCUSSION.

DR. HENRY S. LOTT, Winston, N. C.—During the past year I have been much impressed with the results of simple drainage of that territory in liver cases. In several cases, after a thorough exploration through an ample right rectus incision, in which I found no stones, but simply an atrophied and harmless gall-bladder, and could establish no malignancy, I have drained; sometimes through a second flank incision, closing the primary one; with a rubber tube carrying a gauze wick, well up under the liver at the junction of the cystic and common ducts, as high up as I could carry the tube, and left the tube in until nature put it out, with the result that the patients got well. I have watched them since for weeks and months and they have recovered. The jaundice all cleared up, and nausea and vomiting and inability to take food were relieved. They are now able to take food in abundance; they have gained in flesh and strength and are well.

DR. ROBERT T. MORRIS, New York City.—This is an important paper. We are apt to mistake this condition for carcinoma. The day after Dr. Deaver presented a paper on this subject two years ago I saw my first case; that is because we find what we are looking or, and within a month I had two cases but none since. This matter of lymphangitis at the head of the pancreas is commonly mistaken for carcinoma, and the points Dr. Swope has made are extremely important. The paper should be read and reviewed when it is published in the Transactions of our association.

PUERPERAL INFECTION DUE TO GAS-FORMING BACTERIA.

BY

EMERY MARVEL, M. D.,

Atlantic City.

CIVILIZATION has given to society comfort, ease and luxury, for which there has been exacted from woman increased dangers in child-bearing. Lesser exercise has defeated physical development, brought a reduction in the caliber of the birth canal, and weakened her propulsive forces. Luxuries have diminished her general resistance, and comforts have taken from her the adaptation which necessity commands. Laceration of the genital outlet, damages from pressure, and a greater tendency to exhaustion of an already weakened general resistance indicate the penalties exacted. To atone for these added penalties civilization should, and does, lessen relative hazards. Certainly fewer lives have been sacrificed by child-bearing in the last half-century as a result of Dr. Oliver Wendell Holmes' valuable contribution to a better understanding of the cause, and the means for prevention as applied against scarlet fever carried to the puerperal woman. There is no doubt that a clearer understanding of the impaired kidney function associated with pregnancy has saved lives that otherwise would, without this knowledge, have been sacrificed in the child-bearing act. Certain it is that the recognition of the microorganic foes, and a better knowledge of the means to fight them, has greatly diminished the mortality resulting from parturition and prevented lives from subsequent invalidism. And yet how hopeless seems the physician's efforts in saving those who have been infected with certain of these microorganisms through avenues made available only as a result of conception and its subsequent delivering. The occasions of these cases startle the community in which they occur, throw horrors into prospective mothers and give fears to those eligible for conception. These tragedies, though infrequent they may be, cry for still greater efforts upon the part of each of us to lessen, if not entirely eliminate, the existing jeopardies incident to woman's most noble effort, the accomplishment of motherhood.

"*Puerperal Infection an Indefinite Term.*"—When reference is

made to "Puerperal Infection" it conveys the idea of that time subsequent to the expulsion of uterine conception when microorganisms invade the woman. This reference does not in its usage convey any clear understanding as to the character of the invading enemy. The term as used was adequate for its purpose, no doubt, when antedating any knowledge that defined the difference in the character of the organisms or the manner of their operations. Since bacteriologists have identified various microorganisms common to this diseased condition, and pathologists have studied and recognized the characteristic differences in their operations, it is no longer sufficient to be content with a diagnosis so general, but it behooves us to know exactly what organism is the factor in the infection. To know this fact is of great importance in order that one may establish a successful warfare against the enemy. No longer would the physician be justified in treating all chills and fever by one and the same method without determining the cause of the chills and fever in the particular case. Whether the chills and fever be due to a cholecystitis, an obstructed pyelitis, empyema, malaria or another cause matters much, for in each the treatment is different, and diversely different, in order to obtain the desired relief. It is little less important that the special bacterial factor be determined in a puerperal infection. To determine whether the invading organism is a streptococci, staphylococci, colon bacilli, pneumococci, or bacilli aerogenes capsulatus becomes all important if we hope to give the most efficient care to the afflicted.

Gas-forming Bacteria.—It is our desire to call attention in this discussion to that form of infection occurring during the puerperium which is associated with gas formation in the tissues. This form of infection has been properly termed gas-sepsis. The colon bacillus is a gas-forming bacillus, but as pointed out by Welsh(1) and others, its gas-forming function takes place only in the presence of carbohydrates. Klotz and Holtzman(2) after analyzing the gas-forming bacteria described by Welsh, Fränkel, Veillon, Zuber, Lindenthal, Kruse, Sternberg and Buday state: "We feel that the production of gaseous gangrene in life is in the majority of cases due to the infection by bacillus aerogenes capsulatus or one of the members of this group and that gas formation in the tissues by bacilli coli remains unproven." It is the bacillus aerogenes capsulatus that commands our especial consideration. The bacillus was discovered by Welsh and described by him and Nuttal(3) in 1892. Welsh recovered it from the blood. It is not an uncommon occupant of the intestinal canal and is common to the soil about closely

inhabited districts. Lahey(4) easily gained growths from the soil of Boston. Surgically it is found most often in wounds of the extremities, especially in crushed wounds of legs. While it finds its way into the circulation, the progress is usually made by extending its operation through the continuity of tissues, selecting the course of least resistance. The progress is usually through the same tissue structure, following muscle preferable to penetrating the sheath. It is rapidly destructive in action. Tissues early become necrotic and, when able to free the gas formed, emit a characteristic offensive odor. This organism progresses most rapidly under sealed dressings or when the outlet is reduced to a minimum. Its presence in the uterus after expulsion of the conception, when the fundus is large and the muscle weak, the cervix rigid and the os nearly closed, finds conditions favorable for its workings. The broad ligaments, loosely constructed as they are, become most suitable for contact progress. Here also the systemic involvement may be easily induced by the entrance of the bacilli or its gas products into the circulation.

REPORT OF CASES.

CASE I.—Colored woman. Aged thirty. Pregnant at term. Had been in labor four days. Four doctors individually and collectively had attempted to assist her delivery at different intervals during this period without success. I removed a dead child by abdominal hysterotomy. The delivery of the child was accompanied with an expulsive discharge of offensive gas. Patient died two days later. No bacteriological examination.

CASE II.—History of probable miscarriage of three months' fetus ten days before admission. Six days after miscarriage she experienced chilly sensations; temperature 99 to 101. I found what seemed to be a very sick woman. Slight abdominal (pelvic) soreness but little distention; nauseated and vomiting; mental dullness with a desire to be left alone; rapid heart action (120); and rapid breathing (40); the skin surface of waxy pallor; temperature 99. The absence of any pelvic mass failed to gain from me any indication for operation. She grew continuously worse and puzzled me to explain the cause for the apparent gravity of her condition. For two days rest, stimulation and elimination were adhered to without gain for the better. Diffuse resistance was evidenced upon vaginal examination two days later and I took this to point my duty for vaginal exploration. Free incisions posterior to the cervix permitted

general separation of the tissues without entering the peritoneum, and from this opening a large amount of gas escaped with force and noise. A very small amount of serous fluid escaped. Exploration of the peritoneum showed edema of the structures of the tubes with a fibrinous exudate over their surfaces and that of the uterus. Liberal gauze drainage was placed *in situ*, but no other local treatment. The patient grew steadily worse and perished two days later. Incomplete bacteriological determination.

CASE III.—This case was a neighbor in the ward to Case II. Four days previous to operation on Case II, I removed her tubes which were filled with pus. She started to go wrong two days after her neighbor was operated upon and perished four days later, exhibiting almost identically the same clinical picture as the second case. Postmortem examination found considerable gas in the tissues. I did not operate on her for this condition as I failed to find any physical evidence that, to my knowledge about this, justified such a course. The oncoming of rapid heart action, frequent breathing, bleached mucous surface (both patients were black) abdominal distention and a postmortem revelation of gas in the tissues with no free pus, tells pretty clearly the condition of the infection. There being no gas in the tissues when I operated for removal of the tubes, the probabilities of conveying bacilli aerogenes capsulatus infection from Case II by dressings or other practices of the wards justify me in assuming that the patient received her infection in the hospital.

CASE IV.—A young white girl, twenty-one, induced a miscarriage of a three months' gestation. I saw her in consultation six days afterward with her physician who had made frequent vaginal examinations and one attempt at curettage. I found a desperately ill patient with pulse 130, respiration 38, temperature 102, and little color in the lips or skin. The abdomen was slightly distended and tender only to a small degree. I suspected from the marked pallor that serious hemorrhage had been early present but this was disproved. A very offensive vaginal discharge was present. Vaginal examination showed no circumscribed abnormality. She was transferred to the hospital and cared for by stimulation, proclysis and local cold to head, heart and abdomen. No indication for operation was accepted. She apparently held her own for three days when vomiting added to her increasing distress. She became very apprehensive, was oppressed and collapsed from which she made a partial rally under forced stimulation. Accepting this as a possible rupture of an unrecognized pelvic abscess the culdesac was opened. A force of gas escaped as the tissues were incised, some serum, but

no free pus. She perished some hours later. Cultures from the incision showed large quantities of bacilli aerogenes capsulatus.

CASE V.—Italian woman, twenty-three, pregnant beyond time was sent hurriedly to the hospital after her physician and a midwife had observed her unsuccessful attempt at self-delivery for two days and a night. When I saw her she was extremely distended. A tympanitic percussion note was present over the entire pregnant uterus. She had been referred to me for Cesarean section—at least for a delivery that could not be gained by the help that had preceded. I was somewhat at a loss to explain the significance of this tympanitic tumor, but the evident pregnancy directed my course for her relief by delivering the child. The head was engaged and seemed to be impossible of unassisted egress. Instrumental delivery was effected, but as soon as the head was free the expulsion of gas was manifest with a loud report and a force that staggered me from my position. It at once suggested to me the nature of the infection. A culture was taken which afterward confirmed my suspicion. Treatment was inaugurated upon the assumption that the infection was due to anaërobic organism. Frequent uterine irrigation of peroxide of hydrogen was established and continued. The outlet was kept open from which gas possessing an offensive odor was emitted. The surface, including the uterine cervix, vaginal vault, and a small part of the bladder wall at the fundus, sloughed away. The patient recovered.

Cases I, II, and III lack in bacteriologic confirmation. Stab cultures produced air bubbles in cases II and III but the recognition of the bacillus aerogenes capsulatus organism by a competent bacteriologist was not obtained. The presence of gas in the tissues would seem diagnostic and certainly this, supported by the marked similarity in the course of the disease and nature of infection, would justify the cases being classified as gas-sepsis. I confess my ignorance of the special cause of trouble when treating these early cases. I had no suspicion that I was dealing with the gas-sepsis until gas exuded from the incision. I was not fortified with proper understanding of the organism nor the means to combat its workings. When meeting the fifth case, it was different. The infection was recognized and I set out at once to treat the patient as if it were bacillus aerogenes capsulatus infection. Bacteriologic examination confirmed my suspicion. The patient recovered. This was the only case that did recover and I attribute the recovery not only to the free use of oxygen-giving agents and the liberal exposure but also to the early period of the disease when treatment was established.

Symptoms and Diagnosis.—The one characteristic symptom is emphysema of the tissues. This is associated with blebs and discoloration of the skin. Where the infection is in the extremities or near the surface, this is quite noticeable; but in cases of uterine infection the progress is through the broad ligaments and adjacent tissues, which are not visible, and the infiltration of gas is not easily determined without exploration. The vaginal discharge is dark, thin and syrupy, possessing an odor quite suggestive to one familiar with it and this serves a positive factor in the diagnosis. The vaginal surface is swollen and pale—even ashy hue. The uterus is not necessarily much enlarged though soft and slightly limited in its motion. There is no distinct circumscribed neoplasm but late a diffused increased resistance becomes apparent. The abdomen is distended with increasing soreness, yet not in proportion to the apparent sickness of the patient and but little if any pain is complained of. The extreme sickness of the patient is advanced stages is alarming. This seems out of all proportion to the physical findings and perplexing to explain. The rapid heart (quickly going to 120 or 130), frequent breathing (reaching 50 to 60), the waxy pallor, oftimes a low grade of temperature (99, 101), with the mucous membrane bleached, is the picture common to my observation. This description refers to advanced condition. The skin is much like that of pernicious anemia, though not so yellow. The last stage is delirium with dyspnea and high fever records the end. The finding of the bacilli in the discharges or the blood confirms the diagnosis.

Prognosis.—Dobbins,(5) whose observation of gas-sepsis was the first reported, states regarding his case, "that gas bacilli had been found in the tissues of the fetus and placenta, so a fatal prognosis was given to her husband." This case was reported in 1897 and will convey the general hopelessness of the infection as viewed at that time. Little(6) reports ten puerperal cases in 1910 in which bacilli areogenes capsulatus were found. Only three (including Dobbins' case) died—mortality of 30 per cent. Little elucidated the fact that the presence of bacilli aerogenes capsulatus in the puerperium does not necessarily mean a diseased process. He further makes clear, by contrasting his fatal cases with those of recoveries, that when an active process becomes progressive it portends a fatal issue. The condition is primarily a local one and as such is favorably amenable to treatment, but when it becomes general in its invasion hope of recovery gives way to gravest apprehension. Reports of gas-sepsis previous to 1910 were uniformly fatal, since then the reports of re-

coveries have exceeded the fatalities. This is no doubt due to the recognition of light local infection by bacterial examination and early combative treatment.

The bacilli aerogenes capsulatus infection of the extremities is met with confidence. Here the whole infected area can be removed. Blake and Lahey's(7) contribution of their observations, study and experience in treating these cases has served a great help to surgeons and pointed a way to save many lives that otherwise would have perished. Amputation of the infected area, free open wound and liberal supply of oxygen and oxygen-giving agents permitted them to report 60 per cent. recoveries of their ten cases in 1910. Hewitt(8) reports 30 per cent. recovery of ten cases detailed in 1911. The three recoveries followed the institution of Blake and Lahey's plan of treatment. Klotz and Holtzman(9) collected in 1911 from the surgical services of Mercy Hospital, Pittsburg, a series of thirty-six cases of infection of extremities and give 60 per cent. recoveries. The prognosis of advanced cases of the infection in the puerperium is extremely grave, but not hopeless, and with an intelligent understanding of the nature of the infection may be considered in a hopeful manner.

Treatment.—The organism of gas-sepsis is anaërobic and upon this rests the basis for special treatment. Although this organism may accommodate itself to other circumstances it thrives best and progresses more rapidly free from air or oxygen. To supply either of these elements is to antagonize the infection. When gas-sepsis is suspected, the tissues should be laid freely open and the nests liberally exposed to the air. The application of oxygen adds additional help in opposing the septic process. Lahey and Blake(10) have successfully applied this principle by using free oxygen or hydrogen dioxide into the infected field. Lahey(11) has experimentally blocked the infection by instilling hydrogen dioxide into the tissues approximal to the field of infection, but considers this too dangerous to practise in the human subject. Dioxygen is a convenient agent and promises efficiency not only in the oxygen-giving properties but also in the dissolution of the necrotic tissue, thereby cleansing the surface from this objectionable material. I have had no experience with either the serum or vaccines of this organism, neither do I learn of others who have. The use of either does not commend itself to me in the class of cases here considered. Rest, elimination, support, stimulation and possible dilution of the sepsis is applicable to the treatment of gas-sepsis, but in addition to all this the most important is free exposure of the infected field and a bounteous supply

of air and oxygen. The fight is still more effectual by the removal of the necrotic tissue and by so doing removing nests of bacilli.

Puerperal infection due to the activity of bacilli aerogenes capsulatus is evidently not so rare a condition as first seems apparent. Lendenthal(12) has shown the presence of the bacilli in the vagina without the presence of gas or other pathogenic effect. Welsh(13) tells us it is frequently an inhabitant of the intestinal tract of mammals and it has been found in ischiorectal abscesses. The close proximity of the rectum and vagina makes the transportation from the intestinal outlet to the vaginal inlet a rather easy communication. This is greatly facilitated by the examining hands in the presence of bowel discharges. In two of the five cases in which Welsh(14) recovered the bacilli aerogenes capsulatus organism from dead fetuses *in utero*, the puerperium was followed by an apparent normal course. Welsh (15) asserts that in the majority of cases of gas-sepsis there has been some operative interference, such as criminal abortion, forced delivery or the manipulation of an unskilled mid-wife, preceding infection. The cases cited support this assertion.

It is apparent that there have existed many mild forms of gas-sepsis unrecognized which have followed a favorable course, and yet the extreme serious nature of the cases here reported prompt me to view any suspected case with concern and caution. These experiences emphasize the importance of gaining early recognition of the infecting agent. It is important to have bacteriological examination of the discharges early in the course of trouble. If one waits until gas formation be detected before establishing specific methods to fight the infection, the procrastination will likely prove fatal. In suspicious cases seen late in the progress of the disease, I am convinced that it would be judicious to establish local treatment as if gas-sepsis were present. Should the infection not be due to the bacilli aerogenes capsulatus organism the treatment would be benignant if not beneficial; while should it be due to this agent, the need for its establishment would be imperative and delay would make recovery less probable.

The presence of this organism may not be suspected until its ravages have extended beyond control, unless one be on his guard and consider well its possibility in his observation. The apparent infrequency of its recognition, judging by the paucity of reference in the current literature, has not established so liberal a consideration as its importance deserves. That it exists much more frequently than what we are led to think I am convinced, and certainly the

rapid and certain pace by which it destroys the host, if its course is not defeated, commands a broader and more general dissemination of the knowledge concerning the character of its working in order that it shall be early recognized and effectual treatment be not delayed.

Conclusion.—The possibility of infection with bacilli aerogenes capsulatus during the puerperium is prevalent and its existence is a grave menace to the life of the woman. The seldom recognition of this special infection is out of all proportion to its existence and permits the sacrifice of maternal lives that might with an understanding be otherwise saved. The free exposure of infectious nests and liberal treatment with oxygen-giving agents promise, and have proven, efficient means to successfully fight the affection.

To help awaken an interest in this special form of infection, in order that a general recognition of its probable prevalence be gained and methods be better known whereby fewer lives shall in the future be claimed by the malignant influence of the organism, is the purpose of this paper.

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DISCUSSION.

DR. MAGNUS A. TATE, Cincinnati.—I would like to hear Dr. Morris discuss this paper, because he reported a case of infection from the gas bacillus some years ago.

DR. ROBERT T. MORRIS, New York City.—There is not much to be said about it. We are apt to be misled by gas-forming bacilli, and I am glad Dr. Marvel has put on record the occurrence of these

cases in this connection, showing we must be watchful for the presence of capsulated bacilli.

DR. MILES F. PORTER, Fort Wayne.—I have had one case of gas bacillus infection, following what I presumed to be a clean operation, a nephropexy. The woman made a recovery after opening the abdomen. We had no intraabdominal trouble *per se*, but the peritoneum over a foot of the intestine was underlaid with bubbles of gas. We drained, and she ultimately made a recovery.

A CONTRIBUTION TO THE SEROLOGY OF PREGNANCY AND CANCER.

BY
HENRY SCHWARZ,
St. Louis.

ABDERHALDEN'S observations and discoveries, regarding the protective ferments and the applicability of his biological methods to the diagnosis and study of many pathological conditions, are receiving worldwide attention. The obstetrician and gynecologist is especially interested in this work, because it is in his particular field that these biological tests have found the first practical application.

It has been proved by the observations of many investigators that in diseased conditions of the various organs of the body, likewise in malignant disease and also during pregnancy, the blood is contaminated by cell-albumin from the affected organs, the malignant cells or the chorionic villi, and that the organism responds to the entrance of this blood-foreign material by the mobilization of ferments which effect the intravascular digestion of these proteins. It has also been proved that such ferments are not present in the blood of normal individuals.

Before considering the question whether or not these ferments are strictly specific, it may be of advantage to contemplate the observations on which Abderhalden's work is based, and to follow the evolution of his work to the point at which he submitted his findings to the clinicians and placed his methods in their hands, asking them to explore the new field which he has discovered. In substance these observations are as follows:

Each individual cell of the animal organism leads, in a great measure, the life of a unicellular animal; it consumes food and oxygen and it eliminates the waste products of its metabolism.

The blood is the great purveyor to the cells; it delivers at their door the oxygen and the food which they need to sustain life, and it carries away the products which they throw out.

The protein material which the cells need for the building up and

the repair of their protoplasm is carried to them in the form of the simple building stones of the albumin molecule, the amino-acids.

Day by day this same simple building material is offered to the cells of the body, no matter how varied in character may be the food which the individual consumes by mouth; complete gastrointestinal digestion takes care that the large and complicated albumin molecules of the food are broken up by blasting and splitting, until they are dissolved into the original building stones, and only these are permitted to enter the blood-current.

Thus the cells are not confronted with new problems whenever the character of the individual's food changes; they can work with the same tools, that is, with the same ferments at all times, because the material with which they build remains the same.

In the cell the amino-acids are still further reduced by ferment-action; the resulting products are either burned up for the development of energy and heat, or else they are joined together for the building up of new albumin molecules. Each group of cells builds after plans which differ from those after which other groups of cells build; the resulting protoplasm differs in the various cell groups; the protoplasm in liver cells differs from the protoplasm in kidney cells; and this difference in protoplasm can be demonstrated by biological methods. The same methods prove that there is less difference between the protoplasm of the same organs in different species, than there is between the protoplasm of two different organs in the same individual; for example, there is less difference between the liver protoplasm of a dog and the liver protoplasm of a sheep, than there is between the liver protoplasm of a dog and his kidney protoplasm.

Under normal conditions the cells reduce the products of their metabolism to the simple building stones which they had taken from the blood; nothing is returned by them to the blood stream which retains the characteristics of their particular protoplasm.

Were it otherwise, the blood would soon be contaminated with material from various groups of cells, which other groups of cells could not use in their household and which, in many instances, would interfere with the functions of ductless glands. If, for instance, the ovaries were to send out substances for the activation of the thyroid gland and these hormones, while circulating in the blood, were to meet with particles of unreduced thyroid protoplasm, they would be intercepted and the activation of the thyroid gland would be prevented or impaired.

In a state of health the cells prevent such contamination of the blood; disease or injury, however, may cause them to pass insuffi-

ciently reduced protoplasm in such quantities that the lymphatic system, which is interposed between the cells and the blood-current as a safety mechanism, may be unable to prevent its passage.

Thus in affections of the kidney or the liver the affected organ may pass substances into the blood which still possess individual characteristics of kidney or liver protoplasm; the same is true of all other organs and tissues.

In cases of malignant new formations substances are passed into the blood which retain characteristics of the protoplasm of carcinoma, sarcoma or chorioepithelioma.

During pregnancy the outer covering of the chorionic villi, the syncytium, forms a constant source of blood contamination.

Germ invasion and malignant disease will not only contaminate the blood with their own characteristic material, but by injuring the cells of the invaded organ, they may likewise force these to pass unreduced organ-albumin.

In all these various cases of entrance of blood foreign material into the circulation, the organism tries to defend itself by mobilizing ferments which bring about the intravascular digestion of this material, thereby reducing it to the simple cleavage products of the albumin molecule with which the blood is familiar.

To be sure, the contaminating material is not always purely protein in nature and it may require quite a variety of ferments for its reduction, as for instance, when entire chorionic villi are washed into the circulation, but the proteolytic ferments are best known to us, because their presence can be readily demonstrated by the biological tests of Abderhalden, the dialyzation method and the optic method.

Abderhalden developed and perferted these methods during the last ten years, while he was intensely active in the study of digestion and of cell metabolism.

The results of his investigations during this period are laid down in a great many publications, most of which appeared in the *Zeitschrift fuer physiologische Chemie.* A mere glance at the titles shows how the work spread systematically and logically, until it led to the wonderful discoveries, which have carried Abderhalden's fame to every corner of the scientific world.

"Newer Views concerning the Structure and the Metabolism of the Cell" were followed by "Peptolytic Ferments in Animal and Vegetable Tissues"; next came "The Cleavage of some Polypeptides by the Red Blood-corpuscles and the Blood-discs of Horses and Cattle"; "Peptolytic Ferments in the Cells of Various Forms of

Cancer and Other Tumors"; "Ferments of Various Bacteria"; "The Applicability of the Optic Method to the Solution of Biological Questions;" "Protective Ferments appearing after the Introduction of Body Foreign Proteins, Carbohydrates and Fats."

This work was followed by an attempt to study the effect of the introduction into the circulation of material, which, though native to the body, was foreign to the blood. Experiments on dogs showed that such contamination of the blood stream was likewise followed by the mobilization of protective ferments.

At this period Abderhalden was induced to apply his methods of investigation to the study of the blood in pregnancy and particularly in eclampsia, because in these conditions the deportation of syncytial cells and chorionic villi, to which Veit and Schmorl had called attention, seemed to constitute a good example of the entrance of material foreign to the blood into the system.

The results were convincing and were published in 1910 in a journal devoted exclusively to obstetrics and gynecology, but the publication failed to arouse much interest, presumably because all investigations had been carried on by the optic method. In 1912 appeared the first publication on the diagnosis of pregnancy with the dialyzation method, and early in the same year was published the little volume on "Protective Ferments."

The work was now taken up by others and publications on the serodiagnosis of pregnancy appeared in rapid succession. Abderhalden placed himself and his laboratories at the service of all who were interested in the work and likewise, in numerous publications gave minute instructions in the dialyzation method.

In the United States the work was taken up in the early fall of 1912, but investigators were much handicapped by difficulties in securing the necessary apparatus and reagents, and in some instances, likewise, by a difficulty to secure full and detailed information on the subject, as all publications, up to March, 1913, were in German. They also had to work without the advantage of personal instruction by Abderhalden.

The first articles published in the United States were by Williams and Pearce of Philadelphia, McCord of Detroit, Losee and Jellinghaus of New York, and Schwarz of St. Louis; these articles helped to arouse interest in the work and gave much needed information regarding technic; they also pointed out many of the difficulties and sources of error attached to the dialyzation method.

These publications were followed by articles by Judd of Baltimore,

Gutman and Druskin of New York, and Jamison and Cole of New Orleans.

Publications from Italy, Russia, Germany and other countries are pouring in in a steady ever-increasing stream, and, with few exceptions, they do not only confirm every one of Abderhalden's statements, but they point to a strict specificity of these ferments.

To prove this specificity, beyond all reasonable doubt, pregnancy and cancer seem to offer the most promising field for investigation.

During pregnancy proteolytic ferments are always present, which cause cleavage of placental albumin; in cancer proteolytic ferments are always present, which cleave cancer-albumin. If a number of investigators should test the serum of pregnant cases and of cancer cases both against placental albumin and against cancer albumin, and should find that pregnant serum never causes cleavage of cancer-albumin unless pregnancy is complicated by cancer, and that cancer-serum never causes cleavage of placental albumin unless the cancer patient is pregnant, the proof of the specificity of the protective ferments will be perfect.

One such report has already been published by Epstein, who found that of thirty-seven cancer cases thirty-six gave a positive reaction with cancer-albumin, and all thirty-seven gave negative reactions with placental albumin; on the other hand, seventeen pregnant cases gave negative reaction with cancer-albumin, and positive reaction with placental albumin.

Gambaroff examined forty-five cases of cancer and five cases of sarcoma; forty-four of the cancer cases gave a positive reaction with cancer-albumin; five cases of sarcoma were positive with sarcoma-albumin; cancer serum was negative with sarcoma-albumin, and sarcoma serum was negative with cancer-albumin.

I have recently examined five cases of cancer against two different cancer-albumins and against placental albumin, and have controlled the tests with the serum of five pregnant cases; the cancer-sera gave strong reactions with cancer-albumin, and faint reactions with placental albumin, while the pregnant serum gave strong reactions with placental albumin, and weak reactions with cancer-albumin; the faint reactions seemed to be due to poorly prepared albmuins and the tests will be repeated when better material is available.

In view of the many proofs of specificity it is astonishing that Heilner and Petri should take such a strong stand against it, basing their opinions on a very few experiments on human subjects. They bled two persons and tested their blood against various albumins and obtained negative reactions; they injected small quantities of the

serum back into the individual from which it was derived and bled the same persons again a very short time afterward and found now that the serum gave positive reactions with coagulated placenta, liver, muscle and other tissues.

It is easy to repeat this work, and I have no doubt that before long it will be shown that some errors must have crept into the work of these investigators. I have made only one of these experiments with absolutely negative results (see report of work) and do not feel inclined to follow it up, because in his first publication Petri reported the result of some experiments, which, likewise, have failed to stand the test of time.

In the Harben Lectures for 1907, Ehrlich, in speaking of the biological function of the amboceptor, said: "this I hold under physiological conditions to be that of seizing upon and elaborating nutritive substances."

Thinking that it was not impossible that these specific ferments were of an amboceptor-like nature, I induced Dr. Derivaux of the Washington University Hospital to prepare various placental antigens, and to test pregnancy serum for complement fixation by means of the hemolytic system used for the Wassermann reaction.

Dr. Derivaux did considerable work along that line, but the results were mostly negative; when alcoholic placental extract was used, there took place a partial inhibition of hemolysis. We next tried the dialyzation method and added guinea-pig serum as complement to inactivated pregnancy serum; the results were perfect, but unfortunately the controls showed that guinea-pig serum alone can cause cleavage of placental albumin. We were about to try non-pregnant human serum for complement, when my attention was called to a statement by Petri, in his first publication on this subject (*Centralblatt für Gyn.*, 1913, No. 7) in which he claims that he has demonstrated several times that by adding fresh complement to inactivated pregnant serum, no cleavage of placental albumin can be obtained.

Thereupon I dropped this work but recently Steising has found that adding male serum to inactivated pregnancy serum restores the cleavage power. I have lately repeated Steising's experiment with the serum of four different males, and in each case I have obtained decidedly positive reaction (see report of work). The specificity of the protective ferments seems assured; that they are of amboceptor-like nature needs further confirmation.

APPLICATION OF THESE TESTS IN OBSTETRICAL AND GYNECOLOGICAL PRACTICE.

It has been shown that the protective ferments are present from about the sixth week after the beginning of the last menstruation and that they disappear about two weeks after the expulsion of the ovum.

It will, therefore, be possible to confirm or to eliminate pregnancy in many cases which heretofore remained uncertain until other positive signs of pregnancy by their appearance or by their absence cleared the situation.

In most cases a careful consideration of the clinical history together with a thorough physical examination of the patient should go hand in hand with the serodiagnosis; exceptionally pelvic examination may have to be omitted, especially in cases of amenorrhea in girls or women who have no right to be pregnant. In all cases the result of the serodiagnosis should be safeguarded by a sufficient number of controls, and it should be remembered that a positive test simply means that the body of the person, from whom the serum is obtained, harbors or has recently harbored placental tissue. Ordinarily it means that the woman is pregnant or has been delivered within the last two weeks; exceptionally, however, living placental and syncytial tissue may remain in the walls of the uterus for a long time after the termination of pregnancy. Chorioepithelioma, as a matter of course, give a positive reaction; a case of chorioepithelioma reported by Paltauf, is especially interesting in this connection. What appeared to be a malignant tumor in a woman of sixty-one years of age was removed; the coagulated albumin from this tumor was not acted upon by cancer serum, but it was readily cleft by pregnancy serum. The microscopical examination revealed a chorioepithelioma. If the serum of this patient had been sent to a laboratory without the clinical history, a diagnosis of pregnancy would have been made, which would have been a mistaken diagnosis, although the reaction worked out correctly.

A negative diagnosis means that the body of the person examined no longer harbors living placental tissue; a hematocele resulting from a tubal pregnancy may contain a dead ovum and give a negative reaction. The fetus may be dead and undergoing maceration during any period of pregnancy, and such case will give a negative reaction. The negative serodiagnosis is very helpful in both cases, because it shows that in the first case quoted, fear of continued development of an ectopic gestation need not to form the indica-

tion for operating, and in the second case quoted it confirms the suspicion of the death of the fetus.

EXAMINATION OF SERUM IN TOXEMIA AND ECLAMPSIA.

In cases of toxemia and in eclamptic conditions the serum should be tested; it will be found that the cleaving power of such serum is often deficient or entirely absent. In that event it should be restored by intravenous, subcutaneous or intramuscular injection of normal pregnant serum.

Ruebsamen found little cleavage in ten out of thirteen cases of eclampsia; control by the optic method showed in five cases a rotation of only 0.06°. These were mild cases and recovered; in a fatal case cleavage was entirely absent; a case of hyperemesis gave, likewise, a weak reaction with the dialyzation method, which was confirmed by control with the optic method.

Ruebsamen is inclined to believe that the stronger the cleavage power of eclamptic serum, the greater are the patient's chances of recovery. He has recently treated two cases of pregnancy dermatoses with injections of normal pregnancy serum and effected prompt cures; the serum, 20 c.c. in the one case, and 10 c.c. in the other case, was injected into the gluteal muscles. After the treatment the serum of the one case showed normal cleavage power, that of the other was not examined (private information).

In the obstetrical service of the University of Pennsylvania, in the service of the New York Lying-in Hospital and in the obstetrical service of Washington University, all eclamptic and toxemic cases are at present examined in regard to the cleavage power of their serum. Therapeutic injections of normal pregnancy-serum are made when opportunity offers; the cases observed are as yet too few in number to be used statistically, but it is hoped that such cooperation will in due time furnish reliable information regarding this important subject.

For experimental purposes these institutions can secure sufficient human serum of unobjectionable character; if the treatment proves successful, it may be desirable to use serum of pregnant animals for treatment of such cases on a larger scale. The recent investigations of Schlimpert and Issel furnish additional proof that serum of pregnant mares and pregnant sheep effect the cleavage of human placental albumin.

EXAMINATION OF SERUM IN CANCER.

In all malignant disease the serum should be tested against placental and against cancer albumin; the examination should be controlled by testing pregnancy serum against these same two albumins. In this manner the specificity of these ferments will soon be demonstrated; the serodiagnosis of cancer will be of the greatest value when localities are affected from which it is not possible to obtain material for microscopical examination, and it will be especially valuable in the diagnosis of cure or relapse after radical operations. Patients so operated should have their blood examined from time to time, until it may be safe to pronounce them permanently cured.

In all important examinations, especially when the findings conflict with the result obtained by other investigators, the dialyzation method should be controlled by the optic method (see technic).

REPORT ON WORK DONE IN THE OBSTETRICAL SERVICE OF THE WASHINGTON UNIVERSITY MEDICAL SCHOOL.

Repetition of Petri's Experiment.—Healthy male negro, forty years old; on September 4, 1913, 10 c.c. of blood are drawn at 7 A. M. (before breakfast); at 11 A. M., 2 c.c. of the man's own serum are injected intravenously; another 10 c.c. of blood are drawn at 12 M. (five hours after breakfast); at 4 P. M., six dialyzers are charged with 1.0 of placental albumin and 1.5 c.c. of serum each; the six portions of serum represent the following conditions: (a) pregnant serum; (b) pregnant serum inactivated; (c) male serum No. 1; (d) male serum No. 1 inactivated; (e) male serum No. 2 (after the injection of serum); (f) male serum No. 2 inactivated. The dialyzers are placed in the incubator and kept at 37° for twenty hours; at 12 M., September 5, the dialysates are tested with ninhydrin; the one obtained from the active pregnant serum gives the usual strong positive reaction; the other five dialysates give absolutely negative reactions.

Repetition of Steising's Experiments.—On four different occasions active male serum was added to inactivated pregnant serum, and in each case a pronounced positive reaction was obtained; the reaction was not quite as deep as the one obtained from the same pregnant serum before inactivation.

The result was exactly the same in each of the four experiments, so that the record of the first one, made August 16 to 17, suffices to illustrate this work:

Dialyzer No.	Placental albumin	Pregnancy serum		Male serum		Result with ninhydrin
		Active	Inactivated	Active	Inactivated	
1.	1.0	1.5 c.c.				+++
2.	1.0		1.5 c.c.			
3.	1.0			1.5 c.c.		
4.	1.0		1.5 c.c.	1.5 c.c.		++
5.	1.0		1.5 c.c.		1.5 c.c.	

APPLICATION OF THE BIOLOGICAL TEST FOR DIFFERENTIAL DIAGNOSIS.

In twelve instances serodiagnosis has been employed to clear up cases of doubtful nature; eight of these are included in my report to the American Medical Association, the other four were one of early pregnancy; one of pregnancy in the second month in a woman of forty-eight years, one of pyosalpinx and one of incomplete tubal abortion.

In these twelve cases the biological test led to the correct diagnosis; all tests were controlled by inactivation and by the examination of a case known to be pregnant, and of another case known not to be pregnant. The record of one case is here given for illustration:

Mrs. K., nineteen years old, married five months, was sent to the hospital on September 2, because she had been losing blood from the uterus for five weeks and had pain in the left iliac region; this pain had been noticed for a few days, but was not intense on September 2; patient had not missed any menstrual period; the uterus was not noticeably enlarged; it was anteflected and movable; to the left of the uterus a small tender mass could be felt. September 4, 10 c.c. of blood were drawn and the biological test was made, with the following result:

Dialyzer No.	Placental albumin	Pregnancy serum		Suspected ectopic serum		Male serum active	Result with ninhydrin
		Active	Inactive	Active	Inactive		
1.	1.0	1.5 c.c.					++
2.	1.0		1.5 c.c.				
3.	1.0			1.5 c.c.			++
4.	1.0				1.5 c.c.		
5.	1.0					1.5 c.c.	

Laparotomy September 8; outer half of left tube contains a hemorrhagic ovum of the size of a pigeon's egg; chorionic villi and amniotic cavity in evidence; no embryo.

One case of eclampsia and two cases of hyperemesis gave measurably weaker reactions than normal pregnancy serum.

Forty-one cases known to be pregnant gave positive reactions; thirty cases known not to be pregnant gave negative reactions; the nonpregnant cases included all sorts of gynecological disease, pus tubes, fibroids, cancer and a few male patients; the cases used for Steising's and other experiments are not included in these numbers; they bring the number well above the hundred mark.

I mention this merely to show that my associates and I have done a reasonable amount of work; we have no intention to publish long series of cases; indeed, Abderhalden's methods do not lend themselves to such wholesale work.

TECHNIC.

Dialyzation Method.—The experience of all the many workers in this new field has brought out the fact that, unless strict asepsis and chemical cleanliness is practised, trustworthy results cannot be obtained, and that in all investigations, the results of which are to be compared with those of others, it is absolutely necessary to follow identical methods; to use uniform quantities and concentrations, and to extend dialyzation over the same period of time.

All glassware must be perfectly dry; centrifuge-tubes, dialyzers, containers, bottles for preserving albumins and dialyzers, pipets for handling serum must all be sterile; pipets, test-tubes and graduated measures for other parts of the work, should be sterilized from time to time, and should be cleansed with distilled water, absolute alcohol and ether in the order named each time they have been in use; the hands of the workers must be kept dry and clean, and must never touch dialyzer, albumin, serum or dialysate; mere manual touch of these important factors in the test may cause a wrong reaction, especially if the person is perspiring.

Testing and Preserving the Dialyzers.—The dialyzing thimbles of Schleicher and Schuell are the only ones recommended. Until lately we have used No. 579; these were from old stock and quite reliable, but when the sudden demand for dialyzers sprang up, the quality decreased considerably. These dialyzers have a diameter of 16 mm., and are 100 mm. high; we cut off the top 40 mm. to make them more suitable for this particular test. At present we use No. 579 (a) which is made specially for this work; it is, likewise, 16 mm. in diameter, but only 50 mm. high. These thimbles come in boxes of 25; they are of varying quality; a good many of them are so tight that they will not dialyze peptones; others are so loose that they will permit

albumin to pass. It will be found that about 50 per cent. of these newer thimbles are impermeable to albumin and permeable to peptone; these are the only ones to be reserved for actual work and the rest have to be eliminated.

The thimbles when taken out of their box are dry and hard; they are soaked in cold water for at least six hours; their upper border is threaded with a silk loop for more convenient handling; it is also desirable to mark each thimble so that its work can be easily controlled; for that purpose we use white and blue glass beads strung on the silk loop, using from one to six blue beads, and from one to six white beads after the thimbles have been tested. It is necessary to push the loop with the beads inside of the container before boiling them, as otherwise they become entangled; these thimbles are boiled for five minutes and are then ready to be tested.

Test for Permeability to Peptone.—The thimble is picked out of the water in which it has been boiled by means of a sterile forceps, and charged with 2.5 c.c. of a 1 per cent. solution of peptone (at present we use Seiden-Peptone) to which are added five drops of toluol. The top of the thimble is closed by a sterile artery clamp, the outside of the thimble is washed under the hydrant and flushed with distilled water. The thimble is now placed into a container and suspended from the top by the silk string in such a way that the outer fluid stands 1 c.c. higher than the contents of the thimble, the string being held in position by the cotton plug, which is replaced. The container must be so narrow that the distance between its inner wall and the wall of the thimble does not vary much from 0.25 cm. For containers we use at present so-called hydrometer jars, that is, cylinders with a foot, and a glass rim around the top. These are 14 cm. high, and have an inside diameter of 2.5 cm. The containers are plugged with absorbent cotton and have been sterilized before the test; they have been filled with 20 c.c. of chloroform water covered by a layer of 1 c.c. of toluol.

After inserting the thimble and replacing the cotton plug, the dialyzing apparatus is put into the incubator and kept there for twenty-four hours at a temperature of 37°.

The outer fluid is now tested for peptone. The only reagent we use is ninhydrin in 1 per cent. solution; this is kept in an amber-colored vial. The pipet with which it is measured must be,perfectly dry, as otherwise the strength of the solution will be changed; it is not desirable to keep more of this solution made up than one expects to use within two weeks, as it is apt to deteriorate.

In making the test we use only half the quantities of dialysate

and reagent which Abderhalden recommends. At first we were forced to do so, because it was impossible to secure sufficient quantities of ninhydrin; we have retained this modification, because by using good-sized test-tubes, there is not the slightest danger of boiling over.

From the dialysate 5 c.c. are transferred to the test-tube by means of a graduated bulb pipet, care being taken not to carry over any toluol. To this is added 0.1 c.c. of the 1 per cent. solution of ninhydrin and the contents are now brought to the boiling-point over a spirit-lamp or a small Bunsen burner. It is essential that the boiling should be continuous and even, and that it should be kept up for exactly one minute from the moment at which real boiling has started; mere simmering does not suffice. If peptone is present in the dialysate, the tested fluid will assume a violet-blue color, which becomes deeper as the fluid cools; half an hour is necessary to bring out the reaction in doubtful cases. In testing dialyzers for permeability to peptone a good strong reaction should take place at once, but all tests made should be placed in a row, with the containers and the respective dialyzers behind each test-tube; at the end of half an hour the majority of the tests will show an even intensity of color; all thimbles, whose dialysate has given a deeper or a fainter or a negative reaction, are eliminated.

Test for Impermeability to Albumin.—The thimbles which have survived the peptone test are cleansed in running water and soaked in it for six hours; they are again boiled for five minutes and the same manipulations are gone through as in the peptone test, with the only difference that the thimbles are charged with 1.5 c.c. of serum. Formerly we used larger quantities of serum, mostly animal serum, but very often large quantities of human serum and relatively small quantities of animal serum will give dialysates which react positively with ninhydrin without there being a leak in the thimble; therefore, we are now using human serum in the quantity employed in actual tests; whenever there is a venesection in the hospital, we secure enough serum to test many thimbles; at other times, we secure serum in smaller quantities in various ways.

The same precautions are observed in this test as in the peptone test; after twenty-four hours the dialysates are tested with ninhydrin, and only those thimbles which give an absolutely negative reaction are retained for actual work. The faintest streak of bluish color, visible only when looking through the entire column of the tested fluid when it is held over a white background, eliminates the respective thimble.

Those thimbles which have stood both tests successfully, are again cleansed and are now marked with white and blue beads, as mentioned before. Beads and strings are tucked away inside of the thimbles to prevent entanglement and they are again boiled for five minutes and placed by means of a sterile forceps into a sterile glass jar two-thirds filled with chloroform water. A layer of toluol about 1 c.m. thick is poured over the chloroform water, and the jar is closed with a sterile glass lid. It is convenient to place twelve thimbles in each jar.

When needed for work the thimbles are again cleaned and boiled, and they are always cleaned and boiled in the same way after each experiment.

Much annoyance is saved if one subjects each thimble to rigid control from test to test; a thimble which in one actual test has given a negative reaction, surely does not leak and should be used in a place where a positive reaction is expected in the next test; the one that has given a positive reaction surely is permeable to peptone, and should be placed in the next test in a place where the reaction ought to be negative; in this manner any leak in the dialyzers will be discovered before it works serious damage; when two or three begin to leak, it is best to throw the whole set away and start a new one.

Preparing and Preserving the Albumin.—The rules for preparing albumin from placenta apply to the preparation of albumin from other tissues, except nerves and brain. It should be remembered that placental albumin is the easiest to prepare, because there is no trouble in obtaining fresh material; the difficulties encountered in preparing reliable placental albumin multiply when work with other tissues is undertaken and should be constantly borne in mind.

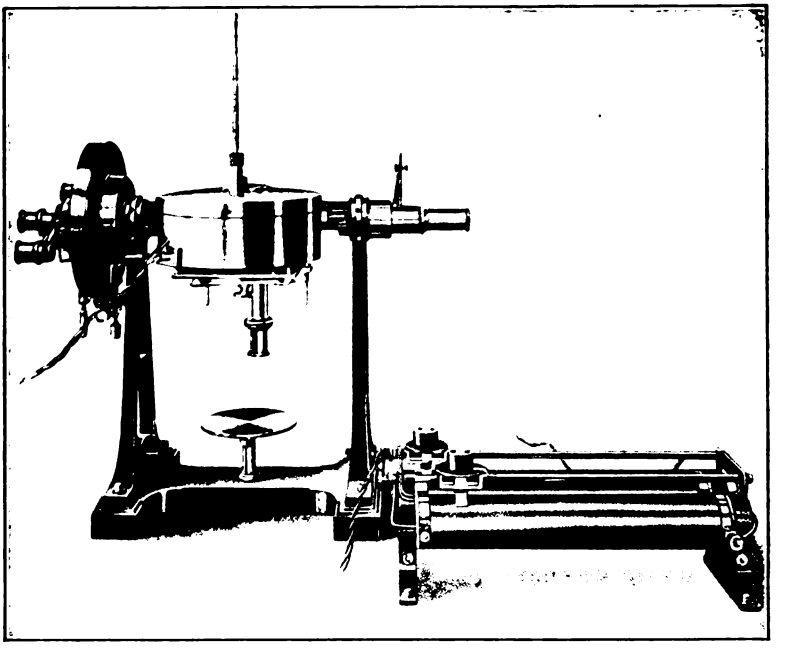
The organs or tissues should be absolutely fresh. To prevent autolysis, they are immediately cut into small pieces, about the size of hazelnuts, and washed in running water, until they are absolutely free from blood. Material which is not blood free, is unsuitable for work, even after the danger of autolysis is removed by efficient boiling, because the serum often contains ferments which cause cleavage of the form elements of the blood. In the case of placental albumin, for instance, such impurity of the albumin might give a positive reaction with serum which has absolutely no cleaving power for syncytial tissue. We must remember these possibilities and offer to the serum an albumin which is made exclusively of the one tissue, with which we wish to seek for ferments.

Schlimpert and Hendy found that it was impossible to wash placenta blood-free with the hydrant water of Freiburg; they finally

succeeded when washing first with normal salt solution, and next with distilled water; the same difficulty may exist in other places.

It should, likewise, be remembered that, while it is desirable to do this work as quickly as possible, one should not stop until the object is attained.

In the case of placenta we proceed as follows: The placenta is born into a sterile basin; it is immediately wiped clean of blood; membranes, cord and the top layer of the placenta (chorionic membrane) are cut away. It is not necessary to remove the decidua



serotina; the remaining portion, consisting principally of placental villi, is cut into small pieces about the size of hazelnuts, which are washed in running water, until they are free from blood and become white. Frequently pouring them into a cloth and squeezing them out hastens the process. In the meantime half a gallon water has been brought to the boiling-point in an enameled pot; two drops of glacial acetic acid are added to this, the pieces of placenta are thrown in and boiled for five minutes, and are then poured on a strainer. We now use metal strainers, which are easily handled and sterilized. Up to this point everything should have been done as quickly as possible.

Now we take our time and cut this boiled tissue into pieces about the size of small peas, because we have found that after sealing a piece of tissue by coagulation on the outside, and cutting it into smaller pieces just before wanting to use it, that it will again require repeated boiling before it is fit for use. The boiling process is repeated twice; after the third boiling the mass of tissues is estimated and boiled once more five minutes in about five times its volume of water. The contents of the pot are now emptied into a sterile strainer placed over an enameled pitcher; some of the water of this boiling is filtered through a hardened filter (Schleicher and Schuell, 575), and 5 c.c. of this filtrate are tested with 1 c.c. of a 1 per cent. ninhydrin solution. If the test is absolutely negative, the albumin is placed by means of a sterile spoon into sterile salt-mouthed, glass-stoppered, amber-colored bottles of 30 c.c. capacity; in each bottle are placed about 12 gm. of albumin; this is covered with chloroform water, and the bottle is filled with toluol and placed into the ice-box.

If the reaction is not negative the first time, it is best to throw the albumin away. For reasons which are hard to explain, some placentæ will not give a negative reaction after many boilings. McCord therefore advocated the use of desiccated placenta; King and Lindig later made the same suggestion; Losee has given this desiccated placenta a fair trial and finds it unreliable.

Method and Care for Securing the Serum.—We secure usually 10 c.c. of blood from a vein in the arm, as a rule from the median basilic, under the same aseptic precautions and in the same manner as we do for bacteriological work.

The sterilized needle must be perfectly dry. Whenever possible the patient should be fasting at the time, for at the height of digestion the blood is apt to contain dialyzable substances, which give the ninhydrin reaction. The blood is drawn into a sterilized centrifuge tube and allowed to stand at room temperature for from two to four hours, at which time from 3 to 4 c.c. of serum have separated which is poured into another sterile centrifuge tube, and centrifuged to throw down the few form elements, which it may still contain. The use of a pipet is not advisable in this transfer, as there is danger of disturbing the blood clot, and of carrying over a considerable number of form elements. This might interfere with the test, as a study of Abderhalden's article on the cleavage of polypeptides by the red blood-corpuscles and the blood-discs makes intelligible. The remaining portion of the serum, still in the first tube, is likewise centrifuged; it is inactivated by heating it in the water-bath to 60° for thirty minutes and used in some of the controls.

Serum that shows the least trace of hemolysis is unfit for use. The serum may be kept on ice for two or three days, but the sooner it is used, the safer is the test; we have never worked with serum that was more than twenty-four hours old.

Importance of Proper Controls.—To prove that whatever reaction we obtain is due to fermentation and not to the presence of dialyzable substances giving ninhydrin reaction in albumin or serum, we duplicate each test with inactivated serum. A control in which albumin alone and serum alone are used, gives no protection, because the albumin and the serum may each give off a certain small quantity of these substances, but not enough to bring about a reaction, while a combination of these substances from the two sources, may easily reach the required minimum to give the ninhydrin reaction. We further control each test for pregnancy with serum from a normal pregnancy case; this serves as a comparison, and it also proves that the placental albumin is reliable. For still further control we use the serum of a nonpregnant person, preferably from one who suffers with a condition which may give rise to the formation of protective ferments; this gives proof of the specificity of these ferments, or at least of the absence of such ferments in the blood of normal individuals.

Description of an Actual Test.—The contents of a jar of placental albumin is poured upon a sterile strainer and washed under the hydrant until it is entirely free from toluol and chloroform; it is next washed in distilled water, and it is then thrown into about five times its volume of boiling distilled water, and boiled for five minutes. If 5 c.c. of the filtered water from this boiling give absolutely negative reaction with 1 c.c. of 1 per cent. ninhydrin solution, the albumin is fit for use and is divided into portions of 1.0 each, which are dropped into the sterile dialyzers. To each thimble is added 1.5 c.c. of serum; an ordinary test requires six dialyzers, one each for active and inactive pregnant serum, one each for active and inactive serum from the person on whom the test is made, and one each for active and inactive nonpregnant serum.

When the making of a correct diagnosis is very important, it is best to duplicate the above, using two dialyzers for each kind of serum; thereby the chance of error on account of a faulty dialyzer is reduced 50 per cent.

When dealing with conditions associated with great destruction of the body proteins, it is advisable to work with only 1 c.c. of serum.

Five drops of toluol are added to the contents of each thimble, which is handled exactly as described in the test with peptone,

except that the sterile containers contain 20 c.c. of distilled water, as the chloroform water would interfere with the fermentation in the actual test. A thick layer of toluol (1 c.c.) covers the outer fluid, and the six or the twelve containers are placed in the incubator.

The experiment should not be interrupted before twenty hours, because it has been shown that the ninhydrin reaction appears after eight hours and reaches its greatest intensity after twenty hours, remaining constant after that time. At the end of this time, each dialysate is tested with the ninhydrin reaction. We test 5 c.c. with 0.1 c.c. of the 1 per cent. solution, boil evenly for one minute, place all the test-tubes in a row and read off the results half an hour after the last test-tube has been placed on the rack.

All dialysates from controls with negative serum must remain colorless; also the one from the active serum of the nonpregnant case; the serum of the pregnant case must show a nice violet-blue reaction. If the dialysate from the active serum of the suspected case shows a similar reaction, the examination has given a positive result, which, with the reservations mentioned, means that the respective person is pregnant.

Colorimetric Scale for Classifying the Intensity of Reactions.

It is customary to speak of weak, medium strong, strong and extra strong reactions. It seems reasonable to compare these reactions with the color given with the ninhydrin test when 5 c.c. of solutions of amino-acids of standard strength are tested with 0.1 c.c. of the 1 per cent. ninhydrin solution. For this purpose we use at present the following solutions of erepton, 1 : 2000; 1 : 4000 and 1 : 6000, and mark these color gauges 1, 2, 3; reaction below and including 3 is weak; reaction above 3 and including 2 is medium strong; reaction above 2 and including 1 is strong; reaction deeper than 1 is extra strong; a reaction of the intensity of a 1 : 2000 erepton solution corresponds nearly with the reaction of normal pregnancy serum during the early and middle months. For permanent gauges we have matched the color reaction of the various ereptone solutions with solutions of crystal-violet (Gruebler) in alcohol; these should be kept in the dark when not in use.

THE OPTIC METHOD.

It is highly desirable that for important investigations and for all new findings the result of the dialyzation method be controlled by the optic method.

So far no work by the optic method has been published except by Abderhalden and his pupils, because the firm of Schmidt and Haensch of Berlin has been unable to furnish the special apparatus with the electrical heating devise and the small tubes especially intended for this work (see illustration). They hope, however, to fill some of the earlier orders before the end of the year. Placental peptone for the optic method has been placed upon the market, so that there will be no difficulty in the optic investigation of pregnancy. Other peptones (cancer, kidney, liver), will be forth-coming, if the demand justifies their manufacture.

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ARTERIAL LIGATION, WITH LYMPHATIC BLOCK, IN THE TREATMENT OF ADVANCED CANCER OF THE PELVIC ORGANS—A REPORT OF FIFTY-SIX CASES.

BY

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(With Tables.)

INTRODUCTORY REMARKS.

No more serious problem in the treatment of malignant disease presents itself to the surgeon than the management of those cases of cancer of the pelvic organs which are commonly placed in the category of the "inoperable, irremovable, and incurable." Unfortunately, a large proportion of patients seek relief when the disease has progressed beyond the Wertheim operation. The presence of enlarged glands in the pelvis renders them, in the opinion of the majority of surgeons, unsuitable cases for this procedure. They are, therefore, consigned to their pitiable fate, with absolutely no hope of cure, and with little prospect of appreciable relief.

I beg to dissent from this opinion, and from this method of dealing with these advanced cases of cancer of the pelvic organs. In the first place, it must be remembered that in many cases enlarged glands are of a purely hyperplastic character, and not cancerous. Lymphatic dissemination through attempt at removal of such glands is not a deterrent factor, and certainly such patients should not be denied the possibility of relief by operation. In the second place, even when there are enlarged cancerous glands in the pelvis, it is sometimes possible, by arterial ligation, to remove these glands *en masse*, and to proceed to do the Wertheim operation, which seemed absolutely impossible before the abdomen was opened. Furthermore, by lessening the blood supply to the cancerous tissue, and by blocking the avenues of lymphatic absorption, the progress of the disease may be retarded, pressure and other symptoms mitigated, and the danger of death from hemorrhage removed, where removal of the cancer mass is impossible. In addition to this,

there is a possibility of correcting other conditions which may be superimposed upon, or which may complicate, the cancer.

Arterial ligation, with lymphatic block, in my opinion, is always to be considered in advanced cancer of the pelvic organs, before pronouncing the case inoperable. In a previous communication[1] I outlined briefly the history of arterial ligation, tracing the evolution of the procedure as applied to advanced pelvic cancer. The technic, as I have adapted and amplified it, was given, and a series of twenty-four cases tabulated. Since the publication of that report I have continued to test the method whenever it seemed to be indicated. The present communication is in the nature of a further report, with additional cases.

INDICATIONS.

It is not to be inferred that arterial ligation with lymphatic block is advocated in all cases of advanced cancer which are no longer amenable to the usual surgical methods for the removal of cancer of the pelvic organs. It may be indicated under the following circumstances:

(1) When hemorrhage, which threatens death, cannot be controlled by other measures.

(2) When hemorrhage has been sufficiently severe or frequent to warrant the fear of fatal return at any time.

(3) When hemorrhage is sufficient to cause a constant drain on the patient's vitality.

(4) When the disease is so extensive as to render curettage dangerous because of hemorrhage.

(5) When there is reason to believe that by controlling, to a certain extent, the progress of the disease, the pain, fetor and discharge may be lessened.

(6) When it is possible, by this means, to relieve various pressure symptoms.

(7) When, in the presence of advanced cancer of the pelvic organs, other conditions which may not be directly due to the cancer call for exploratory laparotomy.

(8) When, in cases seemingly too far advanced for total extirpation with hope of permanent cure, there is yet a possibility that life may be prolonged and suffering relieved, and in some cases radical cure effected. Case 26 is an illustration of this.

[1] Arterial Ligation for Irremovable Cancer of Pelvic Organs—Technic Adapted and Amplified. *Woman's Med. Jour.*, April, 1911.

(9) When all other measures have failed to give any relief from the symptoms in the given case, when the patient demands that something more be done, and when there is any hope of mitigating suffering or prolonging life.

PURPOSES OF THE OPERATION.

The particular application of arterial ligation under discussion is made only in cases of irremovable cancer, and is not to be confounded with ligation employed solely for the purpose of controlling hemorrhage in removable cancers of the pelvis. The term "starvation ligature" has been applied to the procedure when instituted for the starvation of malignant tissue which cannot be safely removed. To the starvation by the cutting off or reduction of the blood supply to the diseased area has been added thorough and complete lymphatic block, which further aids in checking the ravages of the disease. The essential purposes of the combined procedure are:

(1) *To diminish the blood supply to the area of cancerous involvement* by the ligation of the following vessels, or such of them as the individual case seems to require: (a) internal iliacs; (b) ovarians; (c) sacra media. In this way the malignant process is retarded and the bulk of diseased tissue tends to lessen in size in consequence of the decreased blood supply.

(2) *To shut off the avenues of absorption of cancer cells and toxic material* by removing the lymphatic glands and vessels from the receptaculum chyli to the obturator foramen on both sides. The dissemination of the cancer may thus be checked and cachexia delayed or greatly diminished.

In addition to these, the following subsidiary purposes render the operation advantageous:

(3) *To establish positively whether or not a case of advanced cancer is of the irremovable type*, or whether complications, not of a cancerous nature, render the malignant factor seemingly more serious than it is *per se*.

(4) *To remove ovaries and parovarian tissue*, thus eliminating organs, which in themselves, when diseased, quite apart from the cancer, may give many of the symptoms associated with advanced cancer of the pelvic organs.

(5) *To correct complications*, such as kinking of the intestines, adhesions of an inflammatory or evolutionary origin, which may act as mechanical obstructions, etc.

(6) *To correct, if possible, malposition of the uterus*, should this exist. When the uterus is out of position it may, by pressure, cause the symptoms of cancer to be greatly increased in severity.

(7) *To free the ureters*, from the brim of the true pelvis down to the bladder. Sometimes, because of adhesions, beginning hydronephrosis will be found and relieved by freeing the ureters.

(8) *To render more advantageous the application of adjuvant and palliative measures.* With other conditions corrected, the uterus may be curetted, thermocoagulation, thermoradiotherapy, electrocautery, acetone, etc., may be employed.

TECHNIC.

The steps of the operation may be given categorically, as they apply to the average case:

(1) *Laparotomy.*—The abdomen is opened by an incision made a little to the right or left of the median line, the cut being carried quickly through all the tissues, except the rectus, which is drawn to one side, down to the peritoneum. The abdominal cavity having been opened, the patient is placed in the Trendelenburg position. The intestines are displaced toward the diaphragm, in order to give free access to the pelvis, being dyked off with warm pads.

(2) *Ligation of Ovarian Arteries, with Double Oophorectomy.*—The ovarian arteries are ligated just above the brim of the pelvis, one place being sufficient. Pagenstecher thread or strong silk is used for this purpose. The upper part of the broad ligament close to the uterus, with the Fallopian tube, is tied off as well. The ovary, tube and upper part of the broad ligament, including the parovarian tissue, are exsected.

(3) *Incision of Peritoneum on Posterior Wall of Abdomen.*—This is accomplished by a curved incision extending from one internal iliac artery to the other, with the convexity upward, and prolonged downward along the top of the broad ligament, already divided in the preceding step of the operation. As a rule this gives free access to all the retroperitoneal structures in the pelvis.

(4) *Ligation of Internal Iliac Arteries.*—The internal iliac artery of each side is ligated in turn. The artery is carefully separated from its vein and ligated in two places. The first ligature is placed just below the bifurcation of the common iliac, and the second is placed half an inch below the first. With a large plain clamp the artery is crushed between the two ligatures.

(5) *Ligation of the Common Iliac Artery.*—One may be forced, unexpectedly, to ligate the common iliac artery. An advanced atheromatous condition of the vessel, with beginning erosion due to softening of the glands at the bifurcation, may render it necessary to ligate the common iliac just above this point in order to obviate the danger of rupture. This procedure, of course, is to be resorted to only in such unforeseen emergencies. In Cases 12 and 24 of my first series the common iliac of the right and left sides, respectively, was ligated just above the bifurcation, with no unfavorable symptoms in either case.

(6) *Ligation of the Uterine Arteries.*—If it can be accomplished without cutting into cancerous tissue, the uterine arteries may be ligated.

(7) *Ligation of the Obturator.*—What has been said with reference to the uterine applies likewise to the obturator.

(8) *Ligation of the Sacra Media.*—If large enough to warrant it the sacra media is next ligated. One ligature is sufficient for this.

(9) *Lymphatic Block.*—Either before or after this ligation operation the glands along the iliacs are removed *en masse*, if possible, from the receptaculum chyli to the obturator foramen. The glands situated within and around the obturator foramen are removed. I have without difficulty removed the glands in this locality, taking them out *en masse* and placing a hot pad over the area. If any of the glands are so softened that there is danger of breaking them and soiling the peritoneum, the operator must choose between the two evils—leaving them to early break down themselves, or taking them out and running the risk of rupturing them, thus soiling the peritoneum. The danger of this contamination is slight if one is careful to pad off the rest of the peritoneum, and to carefully approximate the edges of the peritoneal wound, covering over the raw surfaces.

(10) *Correction of Accompanying Pathological Conditions.*—After completion of the ligation and removal of the lymph structures, all accompanying pathological conditions are corrected as far as possible and in proper sequence. A great deal more can sometimes be accomplished surgically than seemed possible before opening the abdomen. The uterus may be extirpated in some cases where such a procedure seemed impossible before laparotomy. Volvulus, "kinks" and other abnormal conditions of the intestine, causing obstructive and other symptoms, may be discovered and corrected upon opening the abdomen for purposes of ligation. In many cases the victim of cancer may suffer coincidentally with nonmalignant disease of the ovaries and tubes. Removal of these diseased struc-

tures may relieve the symptoms, the patient having cancer but not as yet suffering directly from it. There is no reascn why a woman should be handicapped by displacement or disease of the ovaries and tubes just because she is the victim of cancer. She should be relieved if possible of these conditions despite the cancer. The ovaries, therefore, should be removed. This is done for the following reasons: (1) In accordance with Beatson's theory of the presumptive influence of ovarian irritation upon the cancer process. (2) An otherwise normal ovary may be subjected to a degenerative process as a result of pressure irritation by the cancer, or by adhesions later in the course of the disease, giving rise to additional preventable discomfort. (3) By cutting away the upper part of the broad ligament, in the removal of the ovary, a certain amount of collateral circulation is shut off, thus facilitating the lessening of the blood supply tc the cancer.

(11) *Closure of the Abdominal Wall.*—The posterior layer of peritoneum is closed, the intestines and omentum are replaced in position, and the anterior layer of peritoneum is brought together with a few simple stitches. The abdominal wall is then closed with through-and-through sutures of silkworm-gut or silk thread, *en masse*, for purposes of expedition.

(12) *Curettage.*—After the abdomen is closed the patient is placed in the lithotomy position and thorough curettage, by the Byrne or other method, may be resorted to when circumstances warrant. With the arteries ligated as above described, the uterus may be curetted to a shell without danger of hemorrhage. Zinc chloride or acetone may be applied to the interior of the uterine cavity, or, if feasible, thermocoagulation may be employed.[1] Curettage and the adjuvant measures mentioned may be employed immediately after the ligation operation, or a week or ten days later, by which time the tissues will be much more contracted. I prefer the latter.

SPECIAL POINTS TO BE OBSERVED.

Success or failure in arterial ligation with lymphatic block is dependent upon various factors—the extent of the disease, the patient's general state, and the complicating pathological conditions.

[1] Bainbridge: (1) "The de Keating-Hart Method of Fulguration and Thermoradiotherapy," *Medical Record*, July 6 and 20, 1912; (2) "Fulguration and Thermoradiotherapy." *The Jour. of Advanced Therapeutics*, January, 1913.
See also *The International Clinics*, September, 1913, and the *Reference Handbook of Medical Sciences*, September, 1913.

Aside from all these, however, success is largely dependent upon certain points of technic which should be borne in mind:

(1) *Adhesions.*—If cancerous adhesions are very extensive, so that it is necessary to break them up in order to reach and ligate the vessels, the operation is contraindicated. Extensive adhesions sometimes result from old inflammation, and may have no relation to the cancer so far as their origin is concerned. Inflammatory adhesions may be safely dealt with and the vessels ligated. It is important, therefore, to differentiate between malignant and nonmalignant adhesions.

(2) *Cicatricial Contractions.*—Cicatricial contractions in the diseased tissue frequently cause pressure upon the ureter, which otherwise may not be involved in the malignant process. In such event the ureter may be stripped up, without breaking the cancerous adhesions, thus relieving the pressure in the neighborhood. If the ureter is directly involved in the cancer this does not apply. Separation of the ureter is accomplished by inserting the finger or an instrument between it and the connective tissue which lies over the cancerous tissue, carefully working the ureter free.

(3) *Occlusion of Ligated Artery.*—The entire success of the operation may be nullified by failure to occlude the vessels ligated. Complete closure is rendered certain by ligating in two places and crushing the artery between the two ligatures.

(4) *Hemostasis.*—Absolute hemostasis is important. Oozing from the veins may be controlled with pads dipped in hot saline solution and left in place on one side while attending to the other.

(5) *Removal of Glands.*—In dealing with suspicious glands situated directly in contact with large blood-vessels, one must be careful to ascertain whether they are softened underneath, while apparently normal on the surface. Failure to note such conditions may lead to rupture of an underlying or contiguous blood-vessel, or to the soiling of the peritoneum by the breaking of such softened glands.

(6) *Injury to Iliac Vein.*—Care must be taken not to injure the internal iliac vein, which lies just to the mesial side and behind the artery. This is the greatest danger of the operation.

CLINICAL APPLICATION.

As previously stated, the operation of arterial ligation with lymphatic block is distinctly a procedure for advanced cancer of the pelvic organs, in which the disease has progressed to such a stage tha t

complete removal is impossible. However, if the method were employed earlier in the course of malignant development better results would doubtless be obtained. Latterly I have had recourse to this procedure earlier than formerly, and in such cases the results have been very satisfactory. When the cancer has become disseminated, especially when it has progressed to the stage characterized by vesicovaginal or rectovaginal fistula, it is too late to hope for very much. In Case 43, however, a patient with vesicovaginal fistula was alive and able to work seven months after operation. The tendency should be toward an earlier rather than a later application of the method.

Cases of advanced cancer in the wards at the New Ycrk Skin and Cancer Hospital in which ligation has been employed have been compared with others at the same time in which it has not been resorted to, and it has been found that in the former the patients are far more comfortable, and progress much more satisfactorily than the latter.

CASES.

The appended table completes a series of fifty-six cases in which arterial ligation with lymphatic block has been employed in advanced cancer of the pelvic organs. The first series of twenty-four cases is summarized here, as previously published.[1] It is to be remembered that the majority have had their death warrant read to them, so to speak, more than once, that they are stupefied with sedative drugs, and that they are practically left without hope of relief except that which comes with death.

[1] *Op. cit.*

SUMMARY OF RESULTS IN THE FIRST SERIES OF TWENTY-FOUR CASES

Case number	I. Length of life after operation	II. Effect upon symptoms	III. Apparent effect upon growth	IV. Effect upon hemorrhage	Remarks
1	Four years, four months.....	Improved.	Retarded.	None present....	I. Barring three
2	Seven weeks....	Improved.	Doubtful.	None present....	patients who died
3	Six months.....	Improved.	Retarded.	None present....	within four days of
4	Three days.....	Negative .	Negative.	Controlled.....	the operation, and
5	Seven months....	Improved.	Retarded.	None present....	three who were not
6	Five months.....	Improved.	Doubtful.	None present....	seen after discharge
7	Six months.....	Improved.	Retarded.	None present....	from hospital, the
8	Six months.....	Improved.	Retarded.	Controlled.....	length of life varied
9	Ten months.....	Improved.	Doubtful.	Controlled (after second operation).	from seven weeks to four years and four months; eight of
10	Ten months.....	Improved.	Retarded.	Controlled.....	this number living
11	Five months.....	Improved.	Retarded.	Controlled.....	eight months and
12	Unknown.....	Improved.	Doubtful.	None present....	more.
13	Two months....	Improved.	Doubtful.	Controlled.....	II. In twenty
14	Ten months.....	Improved.	Doubtful.	Controlled.....	cases there was im-
15	Fifteen months...	Improved.	Retarded.	Controlled (slight hemorrhage toward last).	provement in symptoms.
16	Four days.....	Negative .	Negative.	None present....	III. Growth was apparently retarded
17	Eight months....	Improved.	Doubtful.	Controlled (considerable hemorrhage one month before death).	in ten cases; doubtful in nine cases; negative in four cases.
18	Three months....	Improved.	Negative.	Controlled.....	IV. Hemorrhage
19	Eleven months...	Improved.	Retarded.	Controlled.....	was not present in
20	Eleven months ..	Improved.	Retarded.	Controlled.....	ten cases; controlled
21	Five months.....	Improved.	Retarded.	Controlled.....	in fourteen cases.
22	Four days.....	Negative..	Negative.	None present....	
23	Unknown.....	Improved.	Doubtful.	Controlled.....	
24	Unknown.....	Improved.	Doubtful.	None present....	

Note.—Of the above series four patients were traced up to 1911. Of these, No. 1, operated September 26, 1906, was alive and well[1] March 12, 1911; No. 19, operated March 12, 1910, was alive and well March 12, 1911; No. 20, operated upon March 14, 1910, was alive March 6, 1911, but has died since; No. 21, operated March 14, 1910, was alive and well February 24, 1911. Attempts made in December, 1912, to trace these patients proved futile except in No. 20.

[1] Unless otherwise indicated, "well" refers to the condition as reported by the patients. They are kept as nearly as possible ignorant of the real condition, and in many cases so far as they know are "well."

ARTERIAL LIGATION FOR IRREMOVABLE CANCER OF PELVIC ORGANS, WITH LYMPHATIC BLOCK.[1]

No.	Name	Age	Hospital or private	Diagnosis: 1. Clinical. 2. Microscopic.	Date of operation	Condition found upon laparotomy. Palliative measures other than arterial ligation with lymphatic block	Arteries ligated	Effect upon: 1. Pain. 2. Fetor. 3. Discharge. 4. Hemorrhage. (When present) 5. Extension. 6. General condition.	Results	Remarks
25	Mrs. G. H.	34	Private.	1. Carcinoma of uterus. 2. Carcinoma.	Nov. 19, 1910	Carcinoma of uterus; extension to other pelvic organs Panhysterectomy (Wertheim).	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Died, Nov. 2, 1911	General condition improved for months.
26	Mrs. C. S.	56	Private.	1. Carcinoma of uterus. 2. Carcinoma.	Nov. 26, 1910	Extensive cancer of uterus. Enlargement of pelvic glands. Chronic appendicitis. Panhysterectomy (Wertheim); appendectomy.	Internal iliacs. Ovarians. Sacra media.	1. Entirely relieved 2. Checked entirely 3. Checked entirely 4. Controlled. 5. Apparently cured. 6. Markedly improved.	Discharged, Dec. 26, 1910. Living, July 1, 1913.	Complete abatement of symptoms. Has gained 20 pounds in weight. Perfectly well at present time.
27	Miss I. R.	54	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Dec. 7, 1910	Seemingly too advanced for the Wertheim operation. Pelvic glands involved.	Internal iliacs. Ovarians. Uterines.	1. Entirely relieved 2. Entirely checked 3. Entirely checked 4. Completely controlled.	Discharged, Jan. 21, 1911. Living, July 1, 1913.	Amputation of breast and removal of axillary glands three weeks after ligation

						Coincidental cancer of left breast, with enlarged glands in axilla. After ligation and lymphatic block, panhysterectomy (Wertheim).		5. Apparently cured. 6. Markedly improved.		operation. All symptoms abated. Well after two years and a half.
28	Mrs. G. D.	63	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Dec. 10, 1910	Carcinoma of uterus. Sigmoid adherent to broad ligament. After ligation and lymphatic block it was possible to perform the Wertheim operation.	Internal iliacs. Ovarians.	1. Negative. 2. Negative. 3. Negative. 4. Negative except venous oozing. 5. Negative 6. Negative.	Died, Dec. 12, 1910.	Died of pneumonia and nephritis. Cause of death entirely independent of cancer. Condition of abdomen perfectly satisfactory.
29	Mrs. B. I.	32	Skin and Cancer.	1. Carcinoma of pelvic viscera. (recurrent). 2. Carcinoma.	Jan. 16, 1911	Very advanced recurrent carcinoma of pelvic viscera; contraction, causing obstruction of both ureters. By stripping up the ureters beginning hydronephrosis was relieved. Panhysterectomy (Wertheim) previously performed.	Internal iliacs.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled 5. Doubtful. 6. Improved.	Discharged, Feb. 1, 1911. Moved away, not heard from since.	Discharged in very much better condition than when admitted to hospital. Diseased parts very much contracted. Pain in back, over kidneys entirely relieved.

[1] The technic, including double cophorectomy, was performed as per description unless otherwise specified.
An inventory was taken of the cases July 1, 1913. Patients were traced wherever it was possible, and the conditions found are herewith reported.

ARTERIAL LIGATION FOR IRREMOVABLE CANCER OF PELVIC ORGANS, WITH LYMPHATIC BLOCK.[1]—*Continued.*

No.	Name	Age	Hospital or private	Diagnosis: 1. Clinical. 2. Microscopic.	Date of operation	Condition found upon laparotomy. Palliative measures other than arterial ligation with lymphatic block	Arteries ligated	Effect upon: 1. Pain. 2. Fetor. 3. Discharge. 4. Hemorrhage. (When present) 5. Extension. 6. General condition.	Results	Remarks
30	Mrs. A. K.	68	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Jan. 21, 1911	Carcinoma of cervix and body of uterus. Panhysterectomy (Wertheim).	Internal iliacs. Ovarians.	1. Negative. 2. Lessened. 3. Lessened. 4. Controlled. 5. Negative. 6. Negative.	Died, Jan. 30, 1911.	Considerable shock; died of nephritis and endocarditis. Surgical condition entirely satisfactory.
31	Mrs. A. L.	47	Skin and Cancer.	1. Carcinoma of uterus, ovaries, tubes. 2. Carcinoma.	Mar. 27, 1911	Carcinoma of uterus irremovable. Both ovaries badly cystic.	Internal iliacs. Ovarians. Sacra media.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved until few weeks before death.	Died Nov. 5, 1911.	Considerable hemorrhage before operation; none after operation. Lived seven months and nine days in comparative comfort.
32	Mrs. A. R.	35	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Apr. 3, 1911	Cancer of uterus. Cervix and walls of vagina involved.	Internal iliacs. Ovarians.	1. Lessened. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Discharged, Apr. 27, 1911. Living, May 15, 1912. Lost sight of.	Marked improvement in all symptoms. Living in comparative comfort, when last seen, one year after operation.

33	Mrs. M. F.	45	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Apr. 24, 1911	Extensive carcinoma of pelvic organs with hyperplasia of glands. Both ovaries the seat of noncancerous inflammation evidently causing great deal of pain.	Internal iliacs. Ovarians.	1. Lessened. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Died, Sept. 25, 1911.	Patient was rendered more comfortable after operation, particularly with regard to pain.
34	Mrs. A. F.	61	Skin and Cancer.	1. Carcinoma of pelvic viscera with extension to abdominal viscera. 2. Carcinoma.	Feb. 8, 1912.	Extensive involvement of pelvic organs. Irremovable.	Internal iliacs. Ovarians.	1. Negative. 2. Lessened 3. Lessened. 4. Controlled. 5. Negative. 6. Negative.	Died, Feb. 11, 1912.	Died of pneumonia., Too advanced for operation, but patient begged that operation be done as nothing else gave her relief.
35	Mrs. L. F.	54	Skin and Cancer.	1. Carcinoma of uterus, ovaries. tubes and broad ligaments. 2. Carcinoma.	Feb. 15, 1912	Irremovable cancer of uterus: large ulcerating mass in pelvis.	Internal iliacs. Ovarians.	1. Controlled. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Died, Jan. 25, 1913.	Patient lived about a year after operation. Died not knowing she had cancer.
36	Mrs. J. P.	54	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Apr. 1, 1912.	Irremovable carcinoma of uterus and contiguous structures. Bladder and rectum involved.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Died, May 24, 1912.	Considerable bladder pain, with almost continuous hemorrhage. Operation imperative on account of hemorrhage.

[1] The technic, including double oophorectomy, was performed as per description unless otherwise specified.
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ARTERIAL LIGATION FOR IRREMOVABLE CANCER OF PELVIC ORGANS, WITH LYMPHATIC BLOCK.[1]—*Continued.*

No.	Name	Age	Hospital or private	Diagnosis: 1. Clinical. 2. Microscopic.	Date of operation	Condition found upon laparotomy. Palliative measures other than arterial ligation with lymphatic block	Arteries ligated	Effect upon: 1. Pain. 2. Fetor. 3. Discharge. 4. Hemorrhage. (When present) 5. Extension. 6. General condition.	Results	Remarks
37	Mrs. T. K.	44	Skin and Cancer.	1. Carcinoma of pelvic viscera. 2. Carcinoma.	Apr. 15, 1912.	Extensive involvement of pelvic viscera. Carcinoma right groin. Ovaries and appendix badly diseased (noncancerous). Ovaries and appendix removed.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Died latter part of May, 1913.	Lived in fair condition. Able to be up and about for more than a year.
38	Mrs. B. P.	50	Skin and Cancer.	1. Carcinoma of uterus, cervix, broad ligaments and intestine. 2. Carcinoma.	May 3, 1912.	A large carcinomatous mass involving uterus, cervix, broad ligaments and intestine. Irremovable.	Internal iliacs. Ovarians.	1. Lessened. 2. Lessened. 3. Lessened. 4. None present. 5. Negative 6. Negative.	Died, May 13, 1912.	Died of pneumonia and nephritis.
39	Mrs. R. G.	51	Skin and Cancer.	1. Carcinoma of uterus.	June 25, 1912.	Irremovable carcinoma of uterus	Internal iliacs. Ovarians.	1. Relieved. 2. Lessened.	Discharged, July 18, 1912.	Living one year after operation.

				2. Carcinoma.		Both ovaries involved in adhesions of inflammatory character.		3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Living, July 1, 1913.	Able, July 1, 1913, to do light housework.
40	Mrs. H. S.	41	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	June 30, 1912	Extensive involvement of uterus and contiguous structures. Irremovable. Left ovary badly diseased; noncancerous adhesions.	Internal iliacs. Ovarians.	1. Entirely relieved. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Discharged, July 9, 1912. Living, Jan. 1, 1913. Lost sight of.	Discharged in good condition. Living six months after operation, feeling very well. So far as patient knows is free from cancer.
41	Mrs. A. McC.	35	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Nov. 14, 1912.	Extension of carcinoma to broad ligaments. Pelvic glands greatly enlarged. Ovaries and tubes badly diseased (noncancerous).	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. No change.	Died, Feb. 23, 1913.	Confirmed morphine habit before admission. Few weeks before death became insane and was removed to Bellevue Hospital.
42	Mrs. J. B.	38	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Nov. 18, 1912.	Irremovable carcinoma of uterus. Marked obstruction of ascending colon. Obstructions corrected.	Internal iliacs. Ovarians.	1. Entirely relieved. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Discharged, Dec. 16, 1912. Living, July 1, 1913.	Patient better in every way. Hemorrhage ceased. At present doing light housework.

[1] The technic including double oophorectomy, was performed as per description unless otherwise specified.

An inventory was taken of the cases July 1, 1913. Patients were traced wherever it was possible, and the conditions found are herewith reported.

ARTERIAL LIGATION FOR IRREMOVABLE CANCER OF PELVIC ORGANS, WITH LYMPHATIC BLOCK.[1]—*Continued.*

No.	Name	Age	Hospital or private	Diagnosis: 1. Clinical. 2. Microscopic.	Date of operation	Condition found upon laparotomy. Palliative measures other than arterial ligation with lymphatic block	Arteries ligated	Effect upon: 1. Pain. 2. Fetor. 3. Discharge. 4. Hemorrhage. (When present) 5. Extension. 6. General condition.	Results	Remarks
43	Mrs. D. C.	45	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Nov. 25, 1912.	Advanced cancer of uterus. Metastasis in bladder, broad ligaments, and pelvic lymphatic nodes. Vesicovaginal fistula Ovaries diseased.	Internal iliacs. Ovarians. Sacra Media.	1. Entirely relieved. 2. Practically controlled. 3. Practically controlled. 4. Controlled 5. Checked. 6. Improved.	Discharged Dec. 25, 1912. Living, July 1, 1913.	General condition excellent; has gained in weight, able to go to work, wearing a support, since leaving hospital. Comfortable excepting for leakage from bladder. Persistent in desire to have urine controlled. Marked cachexia entirely gone.
44	Mrs. S. M.	52	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Dec. 30, 1912.	Irremovable carcinoma of uterus. Adhesions between uterus and sigmoid corrected.	Internal iliacs Ovarians.	1. Mitigated. 2. None present. 3. Lessened. 4. None present. 5. Checked. 6. Improved.	Discharged Jan. 25, 1913. Living, July 1, 1913.	General condition very much improved after operation.

45	Mrs. C. D.	36	Skin and Cancer.	1. Pronouncedly malignant tumor (carcinoma?) in cul-de-sac of Douglas, involving uterus and rectum. 2. Studied by several pathologists; classification to be determined; several tentative opinions.	Jan. 9, 1913.	Tumor filled cul-de-sac of Douglas, involving rectum and cervix. Small intestine adherent to uterus. Intestine freed and raw surfaces turned in. Panhysterectomy, removing an inch and a half of vagina and a small portion of anterior wall of rectum size of silver dollar. Enlarged glands in pelvis removed.	Internal iliacs. Ovarians.	1. Entirely relieved. 2. Entirely relieved. 3. Entirely relieved. 4. None present. 5. Checked, apparently. 6. Greatly improved.	Discharged Feb. 13, 1913. Living, July 1, 1913.	Patient feels "perfectly well," has gained in weight, all symptoms have disappeared, and there are no signs of recurrence.
46	Mrs. A. F.	40	Private	1. Carcinoma of rectum. 2. Character not determined; studied by several pathologists; several tentative opinions given. Malignant adenoma.	Jan. 21, 1912.	Mass size of hen's egg in cul-de-sac of Douglas, involving cervix in front and rectal wall behind. Piece of anterior wall of rectum about two inches square removed. Wertheim operation.	Internal iliacs. Ovarians.	1. Entirely relieved. 2. None present. 3. Checked. 4. Controlled. 5. Checked. 6. Markedly improved.	Living, July 1, 1913.	Perfectly well at the present time.

[1] The technic, including double oophorectomy, was performed as per description unless othewise specified.

An inventory was taken of the cases July 1, 1913: Patients were traced wherever it was possible, and the conditions found are herewith reported.

ARTERIAL LIGATION FOR IRREMOVABLE CANCER OF PELVIC ORGANS. WITH LYMPHATIC BLOCK.[1]—*Continued.*

No.	Name	Age	Hospital or private	Diagnosis: 1. Clinical. 2. Microscopic.	Date of operation	Condition found upon laparotomy. Palliative measures other than arterial ligation with lymphatic block	Arteries ligated	Effect upon: 1. Pain. 2. Fetor. 3. Discharge. 4. Hemorrhage. (When present) 5. Extension. 6. General condition.	Results	Remarks
47	Mrs. F. C.	62	Skin and Cancer.	1. Carcinoma of pelvic viscera. 2. Carcinoma.	Jan. 23, 1913.	Carcinoma of pelvic contents. Uterus irremovable. Ovaries and tubes previously removed.	Internal iliacs.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Unchanged.	Discharged Mar. 22, 1913. Living, July 1, 1913.	Some abatement of symptoms, but general condition about the same.
48	Mrs. G. M. W.	55	Skin and Cancer.	1. Carcinoma of uterus and bladder. 2. Carcinoma.	Feb. 3, 1913.	Carcinoma of uterus base of bladder. Sigmoid, which was attached to cancerous mass below, dissected away, and a piece about 1-1/2 inches in diameter removed.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Doubtful. 6. Unchanged.	Discharged Mar. 16, 1913. Living, July 1, 1913.	Some abatement of symptoms, but general condition about the same.

49	Mrs. M. D.	52	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Feb. 6, 1913.	Uterus hard and firmly fixed; irremovable.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Discharged, Mar. 20, 1913. Living, July 1, 1913.	Able to be up and to do light housework.
50	Miss. I. S.	52	Skin and Cancer.	1. Carcinoma of rectum; fibroid of uterus. 2. Carcinoma of rectum; fibroid of uterus.	Feb. 17, 1913.	Extensive carcinoma of rectum; fibroid of uterus. Panhysterectomy. Resection of rectum and sigmoid.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Living, July 1, 1913.	In Hospital at present time, July 1, 1913. Up and about; gaining slowly. Some incontinence of feces, but no fetor or discharge due to cancer.
51	Mrs. E. McL.	47	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Feb. 20, 1913.	Carcinomatous mass involving vagina, base of bladder and pelvic viscera.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Discharged, Mar. 10, 1913. Living, July 1, 1913.	Bed ridden before operation; now able to be up and to do light housework.
52	Mrs. E. M.	45	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Feb. 24, 1913.	Irremovable cancer of uterus, adherent to bladder and rectum. Tubes, ovaries and appendix badly diseased, but not with cancer. Removed.	Internal iliacs. Ovarians.	1. Entirely removed. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Discharged, May 29, 1913. Living, July 1, 1913.	"Well" at the present time. Does not know she has cancer.

[1]The technic, including double oophorectomy, was performed as per description unless otherwise specified.

An inventory was taken of the cases, July 1, 1913: Patients were traced wherever it was possible, and the conditions found are herewith reported.

ARTERIAL LIGATION FOR IRREMOVABLE CANCER OF PELVIC ORGANS, WITH LYMPHATIC BLOCK.[1]—*Continued.*

No.	Name	Age	Hospital or private	Diagnosis: 1. Clinical. 2. Microscopic.	Date of operation	Condition found upon laparotomy. Palliative measures other than arterial ligation with lymphatic block	Arteries ligated	Effect upon: 1. Pain. 2. Fetor. 3. Discharge. 4. Hemorrhage. (When present) 5. Extension. 6. General condition.	Results	Remarks
53	Mrs. V. B.	45	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Mar. 27, 1913.	Irremovable carcinoma involving vagina, rectum and broad ligaments. Many abdominal adhesions. Almost complete intestinal obstruction.	Internal iliacs. Ovarians.	Negative.	Died, Mar. 30, 1913.	Died of nephritis, uremia, and endocarditis.
54	Mrs. G. S.	55	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Apr. 21, 1913.	Advanced carcinoma of uterus, base of bladder and broad ligaments. Irremovable.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. Controlled. 5. Checked. 6. Improved.	Discharged, May 22, 1913. Living, July 1, 1913.	Perfectly "well" at present time, so far as patient knows.

55	Mrs. I. C.	56	Skin and Cancer.	1. Carcinoma of uterus. 2. Carcinoma.	Apr. 28, 1913.	Advanced carcinoma of uterus and pelvic glands; cystic ovary; intestinal adhesions; involvement of base of bladder and walls of vagina.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. None present. 5. Checked. 6. Improved.	Discharged, May 15, 1913. Living, July 1, 1913.	Patient has returned to work, in very much better condition than before operation.
56	Mrs. M. W.	68	Private	1. Carcinoma of uterus. 2. Carcinoma.	May 10, 1913.	Inoperable cancer of uterus; various adhesions ligated and divided. Appendectomy.	Internal iliacs. Ovarians.	1. Mitigated. 2. Lessened. 3. Lessened. 4. None present. 5. Checked. 6. Improved.	Living, July 1, 1913.	Elevation of temperature before operation due to septic absorption. Now very much better.

[1] The technic, including double oophorectomy, was performed as per description unless otherwise specified.

An inventory was taken of the cases, July 1, 1913: Patients were traced wherever it was possible, and the conditions found are herewith reported.

SUMMARY OF RESULTS.

Case number	Length of life after operation	Effect upon symptoms	Apparent effect upon growth	Effect upon hemorrhage
25	One year	Improved	Retarded	Controlled.
26	Two years and six months.	Entirely relieved	Retarded	Controlled.
27	Two years	Entirely relieved	Retarded	Controlled.
28	Two days	Negative	Negative	Negative.
29	Five months	Improved	Doubtful	Controlled.
30	Nine days	Doubtful	Negative	Controlled.
31	Seven months	Improved	Retarded	Controlled.
32	One year	Improved	Retarded	Controlled.
33	Five months	Improved	Retarded	Controlled.
34	Three days	Doubtful	Negative	Controlled.
35	Eleven months	Improved	Retarded	Controlled.
36	Two months	Improved	Retarded	Controlled.
37	Thirteen months	Improved	Retarded	Controlled.
38	Ten days	Improved	Negative	None present.
39	One year	Improved	Retarded	Controlled.
40	One year	Improved	Retarded	Controlled.
41	Two months	Improved	Retarded	Controlled.
42	Seven months	Improved	Retarded	Controlled.
43	Seven months	Entirely relieved.	Retarded	Controlled.
44	Six months	Improved	Retarded	None present.
45	Six months	Improved	Retarded	None present.
46	Five months	Entirely relieved	Retarded	Controlled.
47	Five months	Improved	Retarded	Controlled.
48	Four months	Improved	Doubtful	Controlled.
49	Four months	Improved	Retarded	Controlled.
50	Four months	Improved	Retarded	Controlled.
51	Four months	Improved	Retarded	Controlled.
52	Four months	Improved	Retarded	Controlled.
53	Three days	Negative	Negative	Negative.
54	Two months	Improved	Retarded	Controlled.
55	Two months	Improved	Retarded	None present.
56	Six weeks	Improved	Retarded	None present.

REMARKS.

I. Barring five patients who died within from two to ten days after the operation, the length of life varied from two months to two years and six months. Two lived two years; five lived one year and more.

II. The effect upon the symptoms was negative in two cases; improved in twenty-four; doubtful in two; entirely relieved in four.

III. The growth was apparently retarded in twenty-five cases; doubtful in two; negative in five.

IV. Hemorrhage was controlled in twenty-five cases; negative in two; none present in five. In the the cases in which the result was negative there was slight venous oozing, but no real hemorrhage.

Note.—Of the thirty-two cases comprising the second series twelve died, three were lost sight of, and seventeen were living July 1, 1913.

ACUTE INTESTINAL STRANGULATION CAUSED BY A FREAK ABNORMALLY MISPLACED APPENDIX.

BY

JOHN A. LYONS, M. D.,

Chicago.

(With One Illustration.)

THE Jacksonian prize essay of Mr. Frederick Treves,(1) published in book form as far back as 1883, on intestinal strangulation, has, since its issue, been a standard work on that interesting subject, and to the present date I doubt if any medical author anywhere has surpassed the painstaking research necessary to produce a work of its character in that special line.

Among many other classifications, he gave the relative frequency of the various forms of strangulation depending on cicatricial bands and false or acquired diverticula caused in women by pelvic peritonitis and in men by typhlitis, perityphlitis, and a very small portion due to appendicitis, these latter being slightly more frequent in men than in women. He also gave those caught in the true or congenital diverticula (Meckel's diverticulum), which, when present, we know is attached to the last 2 or 3 feet of the ileum and remains open and patulous at the umbilicus, representing the vitelline duct of the embryo. This has always been considered a common cause of strangulation.

In the above classifications of strangulation, the case I here present may most properly be reported. Under this head there were 210 cases collected and Mr. Treves divided them into seven forms, giving the number of cases operated on in each class as follows:

1. Strangulation under isolated peritoneal adhesion.....60
2. Strangulation under diverticula and diverticular bands.....40
3. Strangulation by knots and nooses formed by bands,
4. Strangulation by knots and nooses formed by diverticula,
5. Strangulation due to an adherent appendix. 3, 4, 5.....25
6. Strangulation through slits in the omentum and mesentery.20
7. Strangulation under omental ligaments.....15

In classes 3, 4 and 5, there were but twenty-five cases, and of the whole number I judge the appendix was not the cause in over 5 per

cent. of the total strangulations and to this day these figures may be taken as fairly representing the probable relative frequency of the various forms of strangulation, at least in England, but in this country nearly all of our inflammations of the intestines are attributed to the appendix. Therefore, strangulations due to that organ in the United States would possibly have a higher percentage.

Unique or rare cases are occasionally occurring, such as that reported by Mr. Holmes, where a loop of the ileum became strangulated by passing through a hole formed by the fusion of two or more appendices epiploica, which were attached to the sigmoid flexure of the colon. Strangulation through holes in the great omentum has frequently been reported and Dr. Quain described a case in which the cause of death was not clear and where at autopsy it was discovered that 40 inches of the ileum had passed through a slit in the broad ligament of the uterus, and become strangulated. Other bowel strangulations have been reported where portions of the intestines passed through and became strangulated in the foramen of Winslow, and a few have been cited as passing through slits in the suspensory ligament of the liver.

The nearest approach I can find of strangulation to the one I wish to record is that by E. Gillespie(2) of England, reported on March 23, 1912, in the *London Lancet* from which Murphy's General Surgery (General Medicine Series) 1913, vol. ii, of Chicago, makes a splendid plate which I reprint with comment.

In Gillespie's case the obstruction was caused by an acutely inflamed appendix surrounding the gut, its distal end rupturing and becoming attached to the mesentery of the ileum quite a few inches of which finally became strangulated by the gradually constricting effect of the inflamed appendix. The patient was admitted to the hospital with a diagnosis of bowel strangulation, and immediate operation first brought to light that the cause of the strangulation was the diseased and gangrenous appendix. All symptoms of appendicitis, when the patient arrived, were obscured by those of strangulation, even the coils of intestine showing through the abdominal wall by the characteristic step-ladder appearance of obstruction.

A similar case I know of personally, but not reported, occurred in 1908, when Dr. A. Ralph Johnstone of Chicago was called upon to operate on one of his internes suffering from complete bowel obstruction. After opening the abdominal cavity he found a large section of the ileum strangulated by an elongated acutely inflamed appendix. This case was similar in almost every respect to the case of Dr.

Gillespie. Johnstone's patient made a rapid recovery because of early operative interference, while Dr. Gillespie's died in twenty-four hours after operation, seven days after the onset of the disease, six days of which were practically wasted in giving home treatment and making a diagnosis, without his knowledge.

Sir Risdom Bemist reported a case where the inflamed appendix became adherent to an enlarged ovary on the right side and beneath

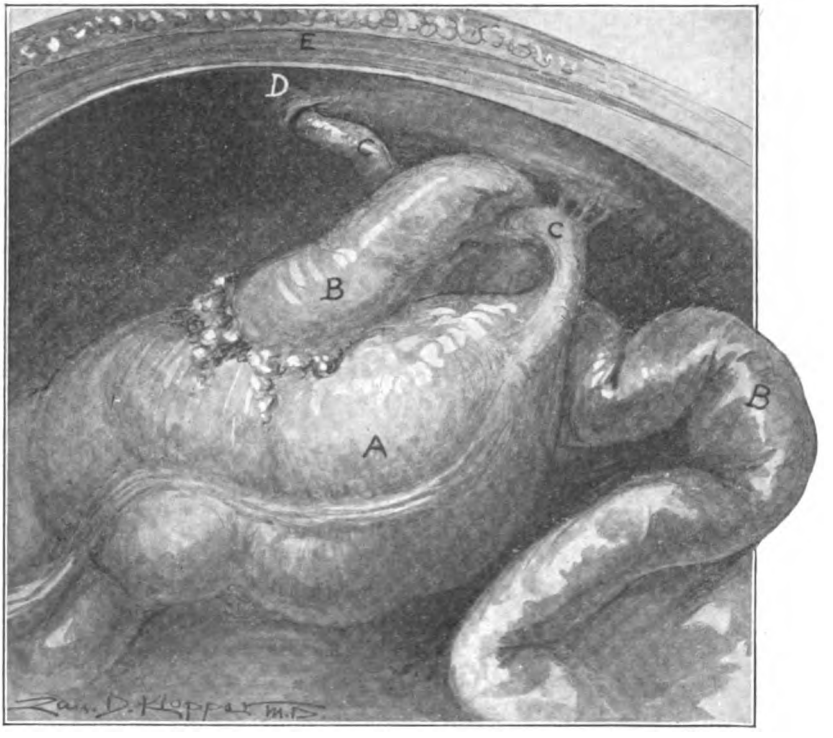

FIG. 1.—A sectional view of abdominal cavity at Median line looking from left side of patient. A. Cecum congenitally(?) suspended well above the pelvic cavity. B. B. Ileum. The portion hanging over loop of appendix was strangulated. C. C. Appendix congenitally(?) attached at distal and proximal ends to abdominal peritoneum. D. Abdominal peritoneum. E. Abdominal wall.

the cord then formed, a loop of the ileum and a part of the ascending colon were constricted until complete obstruction took place.

A few other constrictions and bowel obstructions due to the appendix have been reported, but all have had one or more attacks of appendicitis previous to or associated with the attack of strangulation. In the case I now report the appendix, although abnormally

situated upon the abdominal peritoneum, in all other respects had no indication of ever having been inflamed.

CASE REPORT.—At 2 A. M. on July 27, a hurry night call brought me to the bedside of Mr. B., aged twenty-one, gas fitter, who was in agonizing pain over the entire abdomen, the wall of which was very much distended, the rectum dilated, and the patient extremely restless with a subnormal temperature and rapid pulse.

Appendicitis had been diagnosed by the physician called at the onset of the attack, but pressure immediately over the cecum did not cause greater pain or distress than was already being suffered by the patient; while pressure near the umbilicus gave a great deal more pain and distress. Hence from the signs and symptoms the patient complained of, viz., great pain, rapid pulse, subnormal temperature, abdominal tenderness and distention accompanied by the awful fear depicted in his facial expression, appendicitis might easily have been indicated as was diagnosed. Yet pressure over the iliac fossa, failing to increase the pain, which pain usually radiates to the umbilicus from pressure over the cecum indicated not appendicitis, even if the appendix had been normally located, but some other intestinal trouble possibly intussusception, volvulus or strangulation by bands, etc. The patient was immediately ordered to the hospital, as delay was dangerous and immediate operative interference imperative, for while there are some successes from gas inflations, water injections and tractions in the reduction of bowel obstruction, it did not seem wise to take chances with their uncertainty and with the delay caused thereby, and the conditions discovered subsequently proved these procedures would have been utterly useless.

After general anesthesia and hasty preparation, the incision was made slightly above the McBurney point, where upon opening the peritoneum, the cecum promptly appeared hanging above the abdominal wound, quite healthy, with no induration and no appendix to be felt in the ileocecal fossa by the examining fingers; however, there were marked adhesions above the wound along the abdominal wall, evidently of recent origin. These, at first sight, apparently suspended the healthy cecum in the abdominal cavity, and helped strangulate a mass of small intestines which were now a coffee color. After they were broken up and the section of the ileum which it was supposed they constricted was carefully brought out upon the abdominal wall and surrounded by hot packs, then the appendix, which could not be found in its normal position, was easily discovered perfectly healthy with its distal end attached to or rather deeply imbedded into the abdominal wall near the umbilicus. Its mesentery

was spread out fan-shape, having strong abdominal attachments, just above and to the right of the pubic arch, the appendix and mesentery looking as though they were there attached congenitally. The cecum seemed suspended congenitally in the abdomen, well above the pelvis.

Then in the space between the appendix and the abdominal wall, in which the intestines were strangulated and through which they had in all probability gradually entered when the patient rested or was sleeping on his abdomen (a position he usually assumed when resting or sleeping) and gradually passed until through this opening a large loop of them overhung to the left, and more finally filled this space tightly, until strangulation and obstruction were completely effected.

There are three very unusual, if not unique, conditions apparent in this case.

First.—Bowel strangulation by the healthy appendix.

Second.—The unique location of an apparently healthy appendix, which looked as though it were congenital with this patient, for neither he nor his relatives when closely questioned could recall any illness of any kind to account for the condition.

Third.—Suspension of the cecum above the pelvis by the peculiar attachment of the fan-shaped mesoappendix and the distal end of the appendix itself to the abdominal peritoneum and muscles, this was also apparently congenital, no recent or chronic inflammation appearing at these points, and, as above stated, the patient gave no history of ever having an attack of appendicitis, typhlitis or perityphlitis.

The suspension of the cecum entirely out of the pelvic cavity in this manner is unique, so far as I can discover, and while the appendix situated above in the manner described is not to be desired in preference to the normal, yet it had some advantage over the normally situated appendix, in that it was less likely to have the inflammations from fecal concretions or foreign bodies that frequently occur in the normal position, even though there was no valve at its junction with the cecum, as frequently happens, its higher position preventing the entrance of foreign substances, so that inflammation by continuity from typhlitis or perityphlitis was about all that could have infected the appendix thus suspended, outside of a general peritonitis or a solid packing of the cecum with fecal matter, neither of which conditions had ever of course taken place and no inflammation of this appendix or cecum or sufficient inflammation

of any nature, it seems, had ever occurred to account for its abnormal location.

It is difficult in the confines of a short report to prove this case to be of congenital and not traumatic origin. Yet when we contemplate the child, its infancy, in sickness and in health, the modern woman corseted, compressed and contorted from childhood to old age, some especially so at a period of married life when they might well be proud of their part, in the creation of their offspring and especially if their disfigured condition is not caused by the lack of food and overwork of the poor mother, but due to social functions and contortions of pride or dress to hide the condition they should with modesty be elated at and glory in. With these external causes of distortion and the many contortions and natural cycles and changes peculiar to embryological and fetal life, "the wonder is" not that there is an occasional freak of nature in the intestines, but that there are so few disfigured human beings both internally and externally.

Howard Kelly(3) in his investigations on the embryology of the appendix, which were made in his effort to account for the many deviations and perplexing variations which he found from the normal, maintains the appendix is morphologically and structurally merely a portion of the cecal pouch which has remained in an early stage of development. The cecum arises from the outer and posterior side of the so-called caudal limb of the intestinal loop, between the sixth and seventh weeks of fetal gestation, the small intestines increase in length forming a number of loops and contortions which lie within the umbilical cord occupying its proximal portion, partly in front and partly behind the budding cecum. At the seventh and eighth weeks there begins a rotation of the so-called cranial and caudal portions of the intestines around each other, until the cecum which was previously concealed now lies above the small intestines. At this time a transient vermiform appendix appears representing a stage in the life of the human cecum which at one time more nearly resembled that of the Mangabey monkey or the Gibbon. This, however, disappears and at the end of the eighth or ninth week, the intestines have almost entirely receded from the umbilicus into the fetal body.

Dr. Kelly(4) differs from many other embryologists in maintaining that at about this period of fetal life, the posterior vascular folds of the cecum are slightly to be differentiated and begin to develop into the mesoappendix at about the tenth week, then the cecum with its newly formed appendiceal fold skirts along the free border of the

liver and later, usually between the fourth and seventh months, but occasionally still later and sometimes not completing the cycle until after birth, the cecum with its appendix and the colon make a revolution through an arc of 180 degrees around their own long axis which is completed just before locating in their normal position. During this process one can readily imagine a perfect fusion taking place at the points described, of the distal end of this man's appendix and the mesoappendix with the abdominal peritoneum at that time and occurring at about one-half of its revolution (90 degrees) which was about the position this cecum was found to maintain to the normal.

I wish here to emphasize the fact that retention and supression of urine to a marked degree were present in this case, this being a common factor in nearly all cases of acute bowel strangulation where the pain is very severe, and especially if the ileum is the part of the intestines involved in the strangulation. I would also call attention to the extreme distention of the rectum and descending colon being present, which is a sign differentiating between strangulation and appendicitis. In the former it is always present to a marked degree, in fact in this case the examining hand could discover nothing but the greatly distended rectum and sigmoid in the pelvis with a very much distended bladder, which condition is not nearly so common and often does not occur at all in appendicitis.

I would also call attention to the enormous abdominal tension in these cases of complete bowel obstruction from septic gases, the reduction of which is often difficult and even impossible under general anesthesia, either in the Trendelenburg or any other position. This condition was forcibly impressed upon me when another case of complete bowel obstruction presented a few days after the one reported above, and when an expert anesthetist having a vast experience gave both ether, chloroform and finally ethyl chloride, each being crowded to the limit of the patient's endurance without appreciably relaxing the abdominal wall tension, thus making control of the small intestines difficult and in my effort to find the point of strangulation several feet of the distended bowel were shot out of the abdominal opening several times, causing undue exposure of the intestines with greater danger of peritoneal infection, so that in similar cases one should consider using spinal anesthesia even as the anesthetic of election, and in cases of excessive abdominal wall tension, which cannot be overcome at once by general anesthesia, spinal anesthesia should be immediately resorted to, for in such cases there is great danger in overcrowding general anesthesia.

Fortunately in Case II, there was a healthy large omentum which we used to cover the many lacerated bowel peritoneal surfaces, caused in separating the very extensive adhesions that were present. This beautiful omentum undoubtedly supplied at once a good protection, helping to return a healthy circulation to the denuded intestines and thus helped to prevent a general peritonitis, a very possible condition in his case for forty-eight hours or more. In Case I, on the other hand, not a particle of omentum could be found, although careful search was made for this valuable intestinal protector, so that in view of the many rare conditions present, in Case I it may be considered as having some rare abdominal freaks of nature.

I desire to thank Dr. E. B. Neff who assisted and who observed all the conditions in the first case and vouches for them as above stated; also Dr. R. E. Robbins, who gave the anesthetic; likewise Miss Graff and her two assistant surgical nurses, all of whom came up from bed smiling at the sweet hour of rest (3.30 A. M.), which speaks volumes for the kind fatherly and motherly discipline given by Dr. A. Ralph Johnstone and his superintendent to their interne staff and corps of nurses at Lake Side Hospital.

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4. Same, p. 62.

THE TRAINING OF THE AUXILIARY EXPULSORY MUSCLES OF LABOR.

BY

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IN this age of preventive medicine, it behooves the obstetrician to take his stand upon the side of preparation of the girls in such a way that their accouchement when they become grown will be attended by less dangers and to remedy the natural consequences of the labors in such a way that future pregnancies will be attended by less pain and will be accomplished with greater ease.

Lister and his followers up to our time have robbed the lying-in bed of one of its dangers—sepsis; but there are other dangers that may be annihilated.

In labor we are dealing with a problem in mechanics. Unless the child is too large to pass through the pelvis, or unless it is in such a position that it cannot pass through because of its faulty position, then the only problem that confronts us is the force of the mother's muscles propelling the child onward and the relaxation of the perineal muscles that retard the egress of the infant.

This paper does not deal with the uterus or with the opposing perineal muscles, but alone with the auxiliary striated skeletal muscles. By intelligent training of these auxiliary muscles in girls, by the conservation of their strength during pregnancy and by the proper handling of them after delivery, the state of labor can be made much safer and the condition of pregnancy can be made much more attractive to our women.

The auxiliary muscles which have nothing to do with the dilatation of the cervix, but which aid in the expulsion of the child are:

1. *The Diaphragm*—arising from the whole inner circumference of the thorax, being attached in front by fleshy fibers to the ensiform cartilage and on either side to the inner surface of the cartilages and bony portions of the six or seven inferior ribs and behind to two aponeurotic arches and to the lumbar vertebræ.

2. *External oblique*—arising by eight fleshy digitations from the external surface and lower borders of the eight inferior ribs and in-

serted into the anterior half of the outer lip of the crest of the ilium, tendinous fibers opposite a line drawn from the prominence of the ninth costal cartilage to the anterior superior spinous process of the ilium.

3. *Internal oblique*—arising from the outer half of Poupart's ligament, from the anterior two-thirds of the middle lip of the crest of the ilium and from lamella of the lumbar fascia and inserted conjointly with the transversalis into the crest of the os pubis and pectineal line, into the linea alba and the cartilages of the seventh, eighth and ninth and into the tenth, eleventh and twelfth ribs.

4. *Transversalis*—arising from the outer third of Poupart's ligament, from inner surfaces of the cartilage of the six lower ribs and from the spinous and transverse processes of the lumbar vertebræ, inserted into the lower part of the linea alba, the crest of the os pubis and pectineal line, into the linea alba.

5. *Rectus abdominalis*—arising from the crest of the os pubis and symphysis pubis, insertion into cartilage of the fifth, sixth and seventh ribs.

6. *Pyramidalis*—arising from front of the os pubis and anterior pubic ligament and terminating in the linea alba.

The muscles are mesoblastic in origin and develop by the elongation of the original embryological cells with the multiplication of the nuclei. The unit of the muscle is the muscle fiber, the longest of which, according to Felix, is 12 cm. with a width varying from 0.013 to 0.019 mm. The fibers that have a wide variation in utility are long, while those for strength alone are short and thick. The absolute force of a muscle is in direct proportion to the number of fibers and to their length. Weber has shown that a muscle will contract 47 per cent. of its resting length.

Striated muscles are but poorly reproduced after destruction but recent investigation has shown that muscular fibers are destroyed and do grow during the life of an individual. Schaffer had suggested that there is a formative tissue between tendon and muscle substance, from which, on the one hand, muscle fibers are developed, and, on the other hand, connective tissue and cells are formed. The loss of muscle substance is replaced by new elements developed from free sarcoplasm, which is characterized by rapid growth, and increase in number of the nuclei. These are called myoblasts.

The lack of exercise causes the development of fibrous connective tissue and fat between the muscle fibers.

According to McKenzie, by repeated contraction the muscle cells increase in size and number, the perimysium is strengthened, the

fibrous wall surrounding the bundle of cells is invigorated, and fresh power is imparted to the sheath inclosing the entire muscle. The result is an increase in bulk, in strength and in elasticity.

The absorption of carbohydrates and proteids by muscular exercise causes a hunger for food just as the using of oxygen produces hunger for air. Socrates said of exercise: "The strength of the body is destroyed by violence and idleness but preserved by exercise."

Undoubtedly the uterus itself is sufficiently powerful to expel a fetus, but if the striated muscles are well developed and put to the proper use by the woman, then the termination of her delivery should be more prompt.

The first proposition is to train the abdominal muscles so that they may be ready when the time of need arises. I think this training should be begun while the girl is thirteen or fourteen years old, depending upon the state of her development, and I hold that this training should be systematically carried out by trained teachers after a careful physical examination of the girl has been undertaken by a physician trained in physical exercise work, so that girls that might be injured by the regular exercises can be given modified exercises.

In addition to the regular general gymnastics the series of exercises described now have proven in my hands most effective in the training of the abdominal muscles.

First Exercise.—Lie upon the floor or bed with shoulders back, chest out and whole body fixed rather rigidly, raise the right leg slowly until it is perpendicular to the trunk and slowly bend at the knee, allowing the leg slowly to descend upon the thigh and then to be slowly extended. This is done three times with one leg, three times with the other and then three times with both together: After several days or, in the discretion of the trainer, the following exercise is added.

Second Exercise.—Same position of the body. The leg is lifted from the bed until it is perpendicular to the body; it is then brought down slowly until it lies parallel to the other leg. This is done three times with one leg, three times with the other leg, and three times with both together. After several days or in the discretion of the trainer the following exercise is added.

Third Exercise.—Exactly like the second except the leg is brought almost to the bed and from that suspended position is raised slowly to perpendicular to the body. This is done three times with one leg, three times with the other, and three times with both.

Fourth Exercise.—The feet are fixed underneath a bar in the bed,

the shoulders held back as in the other exercises, the body is bent at the waist with the chest forward, brought up bent forward until the thighs are touched, and then allowed slowly to fall back in place. During this exercise the glottis should be open. This exercise is done three times.

Fifth Exercise.—In an erect position, chest forward, shoulders back, hands on hips and with the feet stationary, the body is rotated slowly to the right with the pelvis as an axis around which it turns. The body is then brought back with the chest and abdomen to the front. The next rotation is made to the left side with the return of the chest and abdomen to the front as in the first exercise. This exercise is carried on five times or as often as the instructor deems advisable.

After the women are impregnated I explain to them why I am anxious to preserve the tone of their abdominal muscles and then give them instructions in masseuring their muscles. After the uterus has become sufficiently large to distend the abdomen, they are fitted into corsets that tend to hold the uterus up and at the same time they are instructed to begin masseuring at night. It seems to me a bad practice to support the uterus without giving the abdominal muscles massage, because the less a muscle has to do, the less it will do. If the abdomen cannot be held up comfortably after the uterus has gotten larger then they put on a Scultetus bandage or some other sling to hold it up and prevent stretching of the muscles. During this period the abdominal muscles are massaged.

After delivery they have placed upon them a snug fitting bandage with a pillow around the fundus, which presses the fundus forward. When the uterus disappears the pillow is removed. After the patient has gotten out of bed, the nurse is instructed to massage the abdominal muscles once a day. When the woman is strong enough she attends to the massage herself.

At the end of six weeks she is examined and, if subinvolution is complete, she is instructed in the series of abdominal exercises described in the first part of this paper and allowed to practise them until it appears that the muscles have regained their tone.

If the woman can be shown that by a systematic care and exercise of the abdominal muscles she can avoid a great deal of backache, she can regain her figure and the carriage of her body, then pregnancy will have been robbed of some of its most serious drawbacks and many women will enter into that state with more hope and pleasure.

There are many women who dread the pregnant state, not because of the discomfort incident to the carrying of the child and its delivery,

not because of the trouble that the raising of the children gives them, but because so many of their friends have dated their loss of youth, both in appearance and in feeling, from their delivery.

Let us train our girls to be mothers and our mothers to retain their girlish appearance and feelings.

THE RELATIONSHIP EXISTING BETWEEN THE MECHANISM AND MANAGEMENT OF THE THIRD STAGE OF LABOR.

A Report of 2600 Cases from the Rotunda Hospital, Dublin, Ireland.

BY

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In reviewing reports of observations on the mechanism of the third stage of labor one is met with the difficulty of interpretation not so much as to the original meaning of the two men whose names are so closely associated with the theories of separation and expulsion of the placenta, but because various divergent views have become read into and incorporated with the opinions and name of one or other of these authors.

It is customary to speak of the mechanism of separation as that of Schultze or Matthews Duncan, but it is not always clear just what the individual observer considers the distinguishing features of each mechanism. Personally, I understand Schultze's mechanism to be the separation of the placenta by the formation of a retroplacental hematoma and the escape of the placenta from the uterus, fetal surface first, inverted through the membranes. By Matthews Duncan's mechanism, the placenta is separated at the edge first, without the formation of a retroplacental hematoma, and escapes from the uterus edgeways or maternal surface first, not inverted through the membranes. When the placenta is separated by Matthews Duncan's mechanism the edge always passes out of the uterus first, after which it may present at the vulva in one of three different positions, viz., some portion of the maternal surface appearing first; second, edgeways folded back on the fetal surface; third, edgeways more or less folded on the maternal surface but not inverted through the membranes.

The conflicting statements by equally reliable observers as to the frequency of occurrence of these two mechanisms indicates the existence of some factor that is not common to the different series of observations, and on this factor the varying results depend. I think that the method of managing or conducting the third stage

is this varying factor and is responsible for the extreme differences of opinion as to the comparative frequency of the occurrence of Schultze's and Matthews Duncan's mechanisms.

The method of conducting the third stage in the Rotunda Hospital, where these observations were made, is as follows:

Within two or three minutes after delivery, which was conducted in the left lateral position, except in extraction after version and in difficult breech cases, the patient was turned on her back with her knees drawn up and separated. The attendant "controlled" the uterus by sinking his hand, ulnar surface down, into the abdomen above the uterus, so that the fundus fitted into the hollow of his palm. The uterus was not interfered with as long as it contracted and relaxed normally and showed no disposition to fill up with blood. Here it may be noted that, as far as statistics are concerned, this method of "control" which, however, must not be confused with massage of the uterus, has no effect on the mechanism of separation, as in a series of 150 cases where the uterus was not "controlled" the relative percentage of occurrence of the two mechanisms was the same as in the larger series from the Rotunda Hospital. One point that did appear, a matter of clinical observation and not direct measurement, was that the amount of blood poured out behind the placenta was greater in the cases in which the uterus was not "controlled."

The placental stage is as much a part of labor as the first and second, and is as much subject to the laws of uterine action; consequently, the latter should not be disturbed in a normal case. Throughout the first and second stages the uterus contracts and relaxes rhythmically and regularly. If this is normal uterine action during the first and second stages, why should it not be considered normal for the third stage? The usual teaching, massage of the uterus to stimulate and maintain tonic contraction during the time while the placenta is being separated, introduces a new and irregular, if not abnormal, factor in the mechanism of separation.

In normal cases, *i.e.*, those in which no bleeding occurred, thirty minutes were allowed to pass before any attempt was made to learn if the placenta had been expelled from the uterus. This rule was made to prevent premature attempts to "express," which is one of the commonest causes of retention of parts or all of the placenta and membranes. At the end of thirty minutes, if the fundus had risen and the uterus had become smaller, more globular, and freely movable in the abdomen; if the cord had descended further through the vulva and failed to pull up when the uterus

was pushed up toward the diaphragm, then it was considered time to "express," as the placenta was no longer subject to uterine action, but was lying in the lower uterine segment and upper portion of the vagina. If these signs were not obtained, no effort was made to express the placenta unless the patient showed some evidence of shock or hemorrhage. Occasionally, at the end of an hour, even if these signs were not obtained, attempts were made to deliver the placenta, but it was no uncommon occurrence to wait one and one-half to two hours and find that, even after this time, normal separation (Schultze's) occurred.

This was what we considered the rational method of managing the third stage of labor and is, fundamentally, the same method that has been practised in the Rotunda Hospital since its establishment in 1745.

In a series of 2600 cases in which the third stage was conducted as above described (with some exceptions to be mentioned later) the following results were obtained:

Fetal surface first—Schultze's mechanism: 2145 times or 82.5 per cent.

Edgeways or maternal surface first—Matthews Duncan's mechanism: 455 times or 17.5 per cent.

These observations were made as the placenta escaped from the vulva and show that, for cases managed by noninterference with uterine action, escape of the placenta fetal surface first is preponderantly more frequent than an edgeways or maternal surface presentation.

In 100 cases of Schultze's mechanism the exact point on the placenta that appeared first at the vulva was marked and the distance from the nearest margin measured. Contrary to Champney's results, our cases showed that this point varied from the placental center to half an inch from the margin, and no part showed markedly greater frequency than another. The figures were:

1/2	inch	= 13
1	inch	= 13
1 1/2	inches	= 8
2	inches	= 19
2 1/2	inches	= 12
2 1/2	inches to centre	= 35
	Total	100

When the placenta appeared with a portion near the edge showing first, rotation usually took place while it was escaping from the vulva and the rest of the fetal surface was delivered before the membranes came away. This rotation might take place in either axis. Such action of the placenta would appear to lend strength to Holzapfel's contention that even when the placenta escaped frankly fetal surface first, it had presented edgeways at the internal os and had been converted subsequently.

To determine the truth of this assertion, I examined forty-three women by manual exploration. In all of these cases the portion of the fetal surface of the placenta that presented first at the internal os also presented first at the vulva, after which, however, rotation in either axis might take place. It was not until the placenta had traversed the vagina and was being expelled through the vulva that a change in the relative position occurred. The exception to this rule was found in those cases in which the maternal surface appeared first. In all of these the maternal edge of the placenta presented and came through the internal os first, rotation then occurring in the vagina, frequently from adhesion of the membranes. The results of these forty-three examinations were:

Fetal surface first, same point at os and vulva.....	=23
Edgeways internal os and vulva.....	=10
Edgeways internal os, maternal surface at vulva....	=10

At first sight this would look as if our percentages of occurrence of Schultze's and Matthews Duncan's mechanisms, mentioned above, were wrong; but it must be remembered that these observations were made on operative cases, many of them having accidental hemorrhage or placenta previa. Only operative cases were chosen, because examinations in these cases would not interfere with the clinical teaching material, intrauterine manipulations had already been carried out, consequently further exploration did not materially increase the risk of infection, and, finally, the fact that the patient was anesthetized freed her from the pain of the manual exploration and its possible effect on uterine action. On account of the danger of infection from too prolonged uterine manipulation, I did not attempt to determine the exact spot at which separation of the placenta began, but contented myself with observing that point on the placental surface that first presented at the internal os. In each instance, except those already referred to, the point's relation to the rest of the placenta was unaltered until the placenta was passing through the vulva, when rotation might or might not occur.

Recently I have had two opportunities for observing directly the beginning separation of the placenta. In two cases of extraperitoneal Cesarean section, I waited long enough to see where the placenta first showed signs of separation, and in each instance it was close to the center. Implantation in one instance being on the fundus and anterior wall, in the other, on the fundus and posterior wall. Of course, two cases are not at all convincing but they furnish us with a visual observation of what may be termed practically normal uterine action, because in extraperitoneal Cesarean section the contractile portion of the uterine wall is not directly interfered with.

One other point of great importance in determining the normal, or at least the desirable mechanism, is to compare the percentages of incomplete membranes in the two classes. In the 2145 cases where Schultze's mechanism obtained, the membranes were incomplete in 108 or 5 per cent. On the other hand, in the 455 cases of Matthews Duncan's mechanism, the membranes were incomplete in 70 or 15.4 per cent.

Adhesion of the membranes has been advanced as an explanation for the occurrence of Matthews Duncan's mechanism, their unequal attachment being supposed to cause the placenta to turn over during its expulsion. This is undoubtedly a factor in turning an edgeways presentation to one in which the maternal surface comes first but cannot cause a change from a fetal surface presentation to one in which the placenta comes edgeways or maternal surface first. If adherent membranes were a factor in determining a Matthews Duncan's mechanism, they would be expected to be incomplete in more than 15.4 per cent. of cases, and how could a fetal surface presentation be accounted for when, as happens not infrequently, large portions, or all, of the chorion is missing?

I personally believe that the greater frequency of incomplete membranes in Matthews Duncan's mechanism is the effect and not the cause, the membranes being torn more often simply because of the unequal pull of the placenta in this mechanism, in contradistinction to the equal pull exerted by the descending placenta separated according to Schultze's mechanism.

Before drawing any conclusions from the foregoing figures, an examination of the class of cases in which Matthews Duncan's mechanism of separation occurs will bring out some more facts tending to show that it is proportionately even less frequent in normal labor than appears from the figures already quoted.

Separation of the placenta by the Matthews Duncan's mechanism

can always be obtained by causing the separation to begin at the edge instead of the middle. Naturally such a state of affairs obtains in cases of antepartum hemorrhage due either to accidental hemorrhage or placenta previa, and artificially it can be brought about by massage of the uterus. If well-marked antepartum hemorrhage, showing tangible separation of the placental margin, were to occur and be followed by presentation of the fetal surface of the placenta at the internal os and vulva, then the above statement as to the cause of Matthews Duncan's mechanism would not be correct; but it receives marked corroboration from our figures. There were twenty-eight cases of antepartum hemorrhage. In every one of these cases the placenta came edgeways, or maternal surface first, not inverted through the membranes. Always, in my experience, antepartum hemorrhage of any moment is followed by separation of the placenta according to the mechanism of Matthews Duncan.

Further evidence to the truth of the statement that Matthews Duncan's mechanism is the result of separation beginning at the margin of the placenta is that in three cases, during the performance of internal version, once accidentally and twice intentionally, I separated from the uterine wall a portion of the edge of the placenta about 4×1 inches. In these three cases the placenta came away maternal surface first.

Two other abnormalities of the third stage associated with an edgeways or maternal surface presentation are retention of the placenta and postpartum hemorrhage. In fourteen cases of postpartum hemorrhage it became necessary to express the placenta directly from the uterine cavity and in each instance it escaped edgeways, followed by a maternal surface presentation at the vulva. The same statement is true of thirteen cases of retained placenta in which the placenta had to be expressed directly from the uterus by Credé's method. That the placenta had not left the uterine cavity was demonstrated by the fact that pressure on the fundus drove the cervix down so far that it was visible and the placenta could be seen as it was expressed through the os. Expression of the placenta for postpartum hemorrhage occurring after it has left the uterus will, of course, have no effect on the manner in which the placenta presents.

In seven cases I demonstrated that, when the placenta is still in the uterus, with the fetal surface near the edge beginning to present, the presentation could be changed by massage and attempting Credé's method of expression. The retroplacental hematoma was squeezed out from behind the placenta, burst through the membranes at the lower margin and sent the edge of the placenta through

the os first, when continued expression caused the placenta to escape with the maternal surface presenting. Thus a primary Schultze's mechanism was changed into a Duncan's mechanism.

This change can be obtained whenever premature escape of the retroplacental hematoma is caused. The condition of affairs is then comparable to a case of antepartum hemorrhage in that the placental margin is separated first. Herein lies the reason why no attempt should be made to maintain tonic contraction of the uterus during the third stage of labor, as the massage necessary to stimulate uterine action is very likely to cause premature escape of the retroplacental hematoma. That Schultze's mechanism occurs with considerable frequency in those clinics where uterine massage is practised is explainable. The massage may not be vigorous enough to cause the escape of the retroplacental hematoma, or it may not be started until the placenta has already separated, as this sometimes occurs with the first postpartum contraction. This is shown in those cases in which the delivery of the placenta immediately follows that of the child.

To sum up—that mechanism of the third stage which results in the greatest percentage of cases in which there is complete delivery of the placenta and membranes, without trouble and without hemorrhage, must be considered normal.

Our results show that when the separation of the placenta is left to the unaided action of the uterus, Schultze's mechanism occurs not only with greater frequency (more than four to one) but also has the added advantage of having a smaller proportion of incomplete membranes (less than one to three). Therefore the conclusion is apparently justifiable that Schultze's is the more desirable mechanism. As by the Rotunda method of managing the third stage placental separation by Schultze's mechanism occurs in the great majority of cases, this mechanism must be considered the normal one where uterine action is not interfered with.

Although it must be admitted that there are a certain number of cases in which the placenta separates by Matthews Duncan's mechanism without discoverable cause, yet the fact that this is the mechanism obtaining in abnormal cases (antepartum hemorrhage, postpartum hemorrhage and retained placenta) furnishes sufficient ground for stating that Matthews Duncan's is the mechanism of abnormal cases, even if it is not to be considered abnormal itself. In addition, as the membranes are incomplete in a much greater number of cases it is also undesirable. To avoid its occurrence it is necessary to prevent as far as possible premature escape of the

retroplacental hematoma, and this is attained by not interfering in any manner with uterine action during the third stage, as it has already appeared that separation by Schultze's mechanism occurs in 82.5 per cent. of cases in which the uterus is not interfered with, and of the 17.5 per cent. of cases in which the placenta separates by Matthews Duncan's mechanism 2.2 per cent. were associated with some abnormality, leaving 15.3 per cent. of cases in which Matthews Duncan's mechanism occurs for no demonstrable reason when placental separation is left to the unaided uterine action. The introduction of an abnormal factor, massage or attempts to express the placenta from the uterine cavity, causes Matthews Duncan's mechanism to occur in the majority of cases, an undesirable result because of the increased percentage of incomplete membranes and their effect on morbidity in the puerperium.

In conclusion I wish to express my thanks to the Past Master of the Rotunda Hospital, Dr. Hastings Tweedy, at whose suggestion this investigation was undertaken, for advice and help throughout and for permission to use the hospital material and records; to the present Master, Dr. Henry Jellett, for permission to continue the use of the hospital material and records during my association with him; to Dr. B. A. H. Solomons, my colleague for three years in the Assistant Mastership, for much help in collecting the data; and to the nursing staff of the Rotunda Hospital, without whose help and hearty cooperation this study could not have been completed.

THE PROBLEM OF MAJOR PELVIC HERNIA IN THE FEMALE.

BY

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THE commonly used term "uterine prolapse" is, in the majority of cases to which it is applied, misleading or at any rate inadequate, for it indicates but one of the associated pathological features in a complex which, to all intents and purposes, is a true hernia of several, if not all, of the important organs in the female pelvis.

Under the usual nomenclature the fact is ignored that not only a part or all of the uterus, but a portion of the bladder and rectum, as well as the vagina, are involved in the common process of descent or protrusion; while the ovaries and some intestinal loops are not infrequently contained in what may, roughly at least, be regarded as a hernial sac.

The desirability of a terminology more accurately descriptive of the whole pathology is not suggested with an idea that it is entirely novel or original, but rather to emphasize the importance of using a label comprehensive of the entire contents of a parcel rather than a single article, and while the hernial character of this condition has not infrequently been hinted at or even alluded to in terms, it has not, so far as the writer knows, been urged as essential to an improved and explicit nomenclature—one which will keep constantly in mind the complete pathological picture.

Pelvic hernia in the female would alone be sufficiently descriptive were it not that *minor* pelvic hernia, such for instance as the obturator, may occur, hence the entire title seems necessary for comprehensiveness.

In approaching the problem, one must, at the outset, disclaim all hope of putting forth a radically new method of dealing with the condition. In view of the variety of technical procedures already in the field, many of them ingenious, some logical, and a few grotesque, and the fact that, in the total, practically every possible means of support—from below, from above and from midway, not to speak of extirpation—has been advocated, it is well nigh impossible to suggest any entirely new single mode of attack.

The most that remains for one who would improve his results in this line of work is by a proper segregation of cases, adherence to certain fundamental objectives and principles, in the light of certain basic facts, to so coordinate some of the already practised steps of technic as to "standardize," if one may borrow a term from modern mechanics (and naturally this whole problem is a mechanical one), a method of treatment, comparable in its way to those accepted for the cure of other herniæ, such as inguinal, umbilical and ventral.

Among the underlying aims, principles and facts to be borne in mind may be mentioned:

1. The necessity of restoring and maintaining, at least approximately, the normal position and relations of the important organs and parts involved, especially those which may still possess a functional activity. Of these the bladder and rectum must continue to functionate throughout life and with these should be included the vagina, except in advanced senile cases, when its function may, perhaps, be disregarded, while the specific function of the uterus is terminated by the menopause.

2. The fact that some, but not all, of the expedients available in the radical cure of herniæ of the contents of the abdomen through its walls can be applied here. Thus muscular and fascial barriers or supports may, and in fact must, be constructed to prevent recurrence after the fashion, in a way, of abdominal herniæ; but in this form of pelvic hernia there is no true sac whose closure by ligation or suture will oppose recurrence, while the canal, which in this case is the vagina, must not, unless in exceptional cases of advanced senility, be closed or materially changed in character or direction but must, on the other hand, be restored as nearly as possible to its original form.

3. Recurrences must be as infrequent, at least, as in other forms of hernia treated by standard operative methods.

4. The operation should introduce no new element of postoperative pain or disturbance.

It may be safely assumed that any operative procedure for the cure of major pelvic hernia which disregards these objectives, principles and facts cannot be thoroughly ideal, and that the greater the departure from them, the less satisfactory will the result be.

In the light of this assumption, it should be of interest to briefly analyze some of the popular methods and note their compliance with and divergence from such fundamental aims, principles and facts.

Perhaps no operation has been more widely accepted and practised than that of interposing the uterus, either in extreme anteversion or

even an inverted attitude, between the bladder and vagina, with or without amputation of the cervix, as the case may demand, and the addition of a perineal repair—the so-called Watkins-Wertheim or Wertheim-Watkins technic as one may choose to regard it.

In its favor may be said that it is pretty certain to prevent a recurrence, except in an extremely senile case with markedly atrophic and flabby uterus, when a descent of the organ carrying the bladder with it may occur even though it cannot parallel the pelvic axis.

On the other hand, this operation distinctly violates the principle that, especially during the period of functional activity, the organs involved should be secured in as nearly as possible their normal position and relations. To fasten a uterus either transversely or semi-inverted in the pelvis of a woman who has not reached the menopause is to so disturb relations as to greatly interfere with two essential functions, pregnancy and drainage of both menstrual and intermenstrual discharges; in fact, it is pretty generally recognized that this operation, when performed on a woman in the child-bearing period, should be accompanied by resection of the tubes to induce sterility. Again, it is asserted by good authority that prolapse operations, as a rule, should be accompanied by sterilization of the sexually active woman, but the desirability of employing, if possible, a method which will not rob these cases of such an important function must be admitted. It is a question also if the bladder, which is then carried as it were on the back of the uterus, will not, when even moderately filled, sacculate in Douglas' pouch and have much the same difficulty in emptying as does the residual pouch of the male bladder behind an enlarged prostate.

Even when applied to cases beyond the climacteric the transverse or semi-inverted position of the uterus must necessarily interfere seriously with leukorrheal discharges from the uterine canal which admittedly exist in many of such cases while, as already remarked, if the postclimacteric uterus be small and flabby it may be forced down again by intraabdominal pressure. For such an organ can follow the pelvic axis—only this time, as it were, head first instead of feet first.

If the above reasoning be correct, it would seem that the interposition operation is not entirely deserving of the popularity which it has acquired.

Another type of radical operation for this form of hernia has been suggested and practised by Murphy, who either implants the fundus of the uterus into the split rectus or else brings it entirely through that muscle, divides the uterus antero-posteriorly and sutures each

half upon the anterior surface of the rectus as two lateral flaps, after dissecting out the uterine mucosa.

This, more effectively than any other operation, disposes of the possibility of a recurrent descent of the uterus, but again, unless applied solely to the postclimacteric organ, destroys its functional capacity, as thoroughly for that matter as would a hysterectomy. And, again, although the inner end of the vagina is drawn securely up against the parietal peritoneum, it does not seem impossible in view of the loose areolar connection between vagina and bladder that a cystocele may not in time recur. In fact, the author of the operation remarks that if this should occur it must be corrected by an anterior colporrhaphy. It would also seem quite possible that the extreme traction produced on the vagina by a complete implantation of the uterus outside the rectus might be productive of subsequent pain.

A third method of procedure, and the simplest of all, provided one can be certain of its effectiveness, harks back to the primitive proposition of an effective repair of the perineum and an anterior colporrhaphy, plus, in most if not all cases, amputation of the cervix. By this method no distortion of the position or relations of the organ is produced and no interference with function. Its weakness, as generally practised, is the large percentage of recurrences of the hernia, but we are assured by no less an authority than Hirst that he has followed this plan for a period of more than ten years and upon several hundred cases, without, so far as he has been able to ascertain, a single recurrence.

The inevitable conclusion to be drawn in comparing such results with those generally reported from the same type of operation is that in one case the perineal and anterior wall repair has been efficiently performed, while in the others some faults of technic have rendered it inefficient.

One thing, however, is undeniable, viz., that no matter what other operative technic is employed, if success is to be assured, it must be supplemented by a thorough repair of both anterior and posterior vaginal walls.

A fourth undertaking for the retention of the uterine part of this hernia, viz., shortening of the uterosacral ligaments through a posterior colpotomy, has this to recommend it, that it deals with the only single ligamentous support of the uterus which, under ordinary conditions, directly opposes the descent of the uterus, and the shortening of which produces a sufficient degree of anteversion of that organ to bring the intraabdominal pressure upon its posterior

surface and so tend to prevent descent by keeping it out of the pelvic axis.

Inasmuch, however, as pathologic shortening of these ligaments, as by an inflammatory process, is a cause of pelvic pain, the question arises whether artificial shortening of the uterosacrals may not also lead to an ultimate painful condition.

A brief reference to uterine extirpation accompanied by narrowing of the vagina and attachment of the inner vaginal end to the broad ligament stumps completes the list of operative types for this condition, although their many modifications far out-number the parent types.

Vaginal hysterectomy, with support of the bladder upon the broad ligaments brought across beneath it and extreme narrowing or even complete closure of the vagina, especially the latter, is a very satisfactory procedure in senile cases of major pelvic hernia where further function of the vagina is a negligible factor; but vaginal hysterectomy without such a radical supplement is likely to result in recurrent prolapse of the vaginal walls, together with bladder and rectum, while, of course, hysterectomy prior to the menopause is only allowable when some diseased condition of the uterus so complicates the hernia as to make removal of that organ independently advisable.

If one may assume from this brief review of the various forms of operative treatment of major pelvic hernia that the problem remains without a thoroughly satisfactory solution as tested by the basic principles that we have ventured to lay down, is there possibly some combination or variation of them which will meet the requirements —a standard, perhaps, that will result in as great freedom as possible from recurrence, that will not materially alter normal anatomical relations, that will not interfere with functional activities and will not create painful conditions?

In the opinion of the writer, all this may be accomplished by first restoring efficiently the normal perineal support of the rectum, and indirectly of the uterus, from below after an amputation of the cervix and by a well-adapted shortening of the round ligaments, after an advancement of the lower bladder wall well up on the anterior face of the uterus in order to take up the cystocele.

Inasmuch as the advancement of the lower wall of the bladder well on to the anterior surface of the uterus without pronounced anteversion of that organ can best be done from above and before the round ligaments are shortened, that portion of the technic should naturally be accomplished first, through a low median incision separating the inner fibers of one or the other rectus. The technic is

simple, consisting of division of the peritoneum in the uterovesical sulcus and a blunt dissection of the bladder from the cervix down to the vaginal junction and then likewise for a sufficient distance from the anterior vaginal wall to enable one, by lifting the bladder thus freed, to eliminate the cystocele, which will be determined by an assistant with a finger in the vagina.

After this has been accomplished the denuded surface of the bladder is attached to the anterior uterine wall by buried chromic gut sutures so that its upper edge, corresponding to what was the vesicouterine sulcus, is carried well up toward the fundus. In separating the bladder care should naturally be taken not to go far enough laterally to disturb the ureters.

In deciding on a method for supporting the uterus by means of shortened round ligaments, the choice naturally falls on the Gilliam method or some modification of it. The Baldy-Webster would be out of the question as it only straightens up without materially elevating the uterus and, moreover, uses the weaker end of the ligament for support. A well-executed Alexander would probably be efficient as both it and the Gilliam suspend the uterus well up by the strong muscular ends of the round ligaments. Inasmuch, however, as the abdomen has already been opened for the bladder advancement, the Gilliam is the natural method to adopt at that stage of affairs.

While the round ligaments, before shortening, are admittedly not an actual support of the uterus against descent, at any rate until the organ is well down to the pelvic outlet, the properly and adequately shortened ligaments furnish an admirable support not only by their actual tensile strength at their inner ends but when reduced, as by the Gilliam technic, they hold the uterus in sufficient anteversion to keep it well out of the pelvic axis and so to prevent its again herniating.

Obviously, if an amputation of the cervix is to be done, it should precede the suspension of the uterus and bladder to insure easy access.

The perineal repair may either precede or follow the suspension. The cystocele being obliterated by the bladder advancement, an anterior colporrhaphy will rarely, if ever, be necessary, unless possibly in some cases to remove redundant mucosa.

If, in certain senile cases, there be marked atrophy of the round ligaments, an abdominal fixation of the fundus may be added to the Gilliam suspension for further security.

Whenever uterine disease accompanying this form of hernia

indicates a hysterectomy, it would seem preferable to perform this through an abdominal incision; then to unite the broad ligaments and vaginal stump, after which the bladder should be separated from the upper vagina, bringing it up and attaching it to the transverse shelf or septum thus formed much in the manner in which it otherwise would be attached to the uterus in order to overcome the cystocele. This blending of the bladder, vagina and broad ligaments will more strongly oppose future descent than where such an amalgamation is not effected.

It will be recognized that this procedure bears a close resemblance to that practised by Goffe, except that Goffe's method is entirely vaginal—even to the shortening of the round ligaments, which consequently are not made to materially elevate the uterus.

The bladder advancement by the upper route has also been suggested by Rector, but he supplements this by an abdominal fixation of the fundus, instead of a suspension and so falls short of the object sought by the writer of providing a technic that will not prohibit pregnancy.

This technic is offered in the belief that it conforms to the various requirements of approximately preserving anatomical positions and relations of the important organs concerned; of not interfering with any physiological functions; of providing, as far as possible, without violating these two conditions, against recurrence and of causing no troublesome sequelæ.

ANATOMY OF THE FEMALE PELVIS AND ITS BEARING ON PROCIDENTIA.

BY

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I HAVE heard Dr. Mayo say that "Every good thing in surgery has been done before and for that matter every fool thing so that it is almost impossible to devise any new procedure." I have no intention of bringing upon my head too severe a storm of criticism by attempting to discuss or recommend any one kind of operative procedure for pelvic displacements. I want only to bring before you a method, that I hope is new, of demonstrating to you and later to medical students some of the factors involved in pelvic surgery with which you are already all familiar—the anatomy of the female pelvis and the conditions and corrections of pelvic injuries and displacements as illustrated by direct color photography. I shall briefly discuss the impressions and conclusions that the work so far done has produced, but only those that I feel I can demonstrate to you in connection with the subject of pelvic prolapse. I am less reluctant in bringing this fruitful subject of debate forward because it has fallen to my lot even on the Pacific coast to see some of the acknowledged failures of eastern operators.

The anatomy of the female pelvis has been very thoroughly worked out by the anatomist in the dissecting room from the anatomical standpoint, but with less regard to the mechanics of the pelvis and the requirements of the surgeon. If we are able to judge from the literature on pelvic surgery, we find that the anatomical conclusions of the surgeons are not always in conformity with those of the dissecting-room workers. The statement has been made that the advance of surgery is going to necessitate the rewriting of our text-books on anatomy to conform with this knowledge. Such a statement, however, is perhaps a little extreme; yet a careful review of the anatomy in the dissecting room will help us as surgeons to understand better the requirements underlying our work.

There are so many contradictory anatomical claims made by surgeons regarding the pelvic outlet that a beginner is at a loss which to believe. A statement one often reads tells us that the fibers of

the levator ani running between the vagina and rectum are few and the greater number go behind the rectum. Again, that when we pick up the lateral muscles for union in a modern perineorrhaphy, we are in reality bringing into apposition fibers which should normally run behind the rectum. The transversus perinei are often accounted to be of no support value. Many harp on the fasciæ as being the important supports and that it is impossible to separate them from the muscles. These claims I hope to prove incorrect.

Such variance of opinion is probably due to the fact that the surgeon deals with the injured perineum and fascial layers in which the normal structures are distorted by scar tissue and retraction and which are probably atrophic from nonuse. As he has little opportunity to work out for himself the uninjured pelvis, he consequently gets a distorted idea of the normal conditions. I want to demonstrate to you the anatomy of the uninjured female pelvis not because I imagine you are unacquainted with it, but because from many of you as teachers I shall appreciate a criticism of the method used.

In this particular subject there are a few strands of muscle tissue between the superior and inferior layers of the superficial fascia. On the removal of the inferior layer or Collis' fascia, we find the ischiocavernosus or erector clitoridis and the bulbocavernosus or so-called sphincter vaginæ running from the attachments on the central tendon and ischium bony origin, forward around the vaginal outlet and vestibule over the clitoris helping to form the prepuce, etc. I do not propose to take your time by detailed descriptions already known to you. You can see how these muscles are not always of uniform size, neither have they very marked muscle bodies, but are of a sheath-like character except just around the vaginal orifice where there is a bigger sling.

The superficial transversus perinei also vary greatly in size and even in the same subject on opposite sides, but I rather believe that where the superficial muscle is small the deep muscle compensates. In this particular subject the deep transversus perinei on the left side has a large well-defined body, whereas the superficial is rather small. On the right side both are of considerable size, and the common statement that the transversus perinei are of little surgical value would in this case be far from the truth. I wish, too, that you would notice the point of origin of these transverse perineal muscles from the bone, for it may strike you as it has me that the origin is further anterior than you expected. Perhaps you can see the impossibility in this subject of separating the central tendon origins from each other and later I will show you how the anterior

portion of the levator ani also blends in with all these superficial muscles. It is the blending of the muscles in the central tendon that helps form the depression that is known as the fossa navicularis when the superficial movable structures are put on the stretch.

The common statement made regarding the levator ani is that the majority of the fibers go behind the rectum forming for that a sling and we are given to understand that so few fibers go between the vagina and rectum that they are of little surgical value and what we really do when we pick up the muscles in perineal repair, is to pull in some of the fibers that should run behind the rectum. I hope to show to your satisfaction how erroneous such a statement is. We are again told that it is not the muscles but the fascia that we get and that we cannot individually identify the muscle. Others, and I myself, have taught and written that if we get the fascia we get the muscle. In a way that is true, but here you see what a generous body of muscle fibers are bunched between the vagina and rectum, and I will show you later that while the fascia coverings are there, they are of the nature of a sliding shelf and one can pull out the fascia without getting the muscle; though in perineal injuries the scar tissue has made them as a rule adherent, so it is true that if you get the fascia, you get the muscle. What we really get in picking up the tissue from the side then is not the rectal sling of levator ani and coccygeus, but the true vaginal sling retracted back into scar tissue. The rectal sling proportionately to the vaginal has more muscle fibers, but these are spread over a much greater area making the muscle strength uniform. The surgeon who punctures with a sharp scissors pierces no fascia layers (provided he goes in the right direction), but only the scar-tissue formation. In picking up his muscle he brings in not only the levator, but attached thereto all the lateral muscles having their origin in the central tendon, and if he will make that grasp broad enough in the anterior-posterior direction, the transversus perinei will be reached and will be of exceeding support value. Here you can see of what marked development is this musculature in this anterior section of the levator ani, and, again, how the fibers run into the lateral walls of the vagina itself tending to prevent vaginal prolapse and favor cystocele and rectocele in pelvic injury, for with the rending of the muscle we get the strain on the fascias which of course stretch.

The statement is often made that the reflection of the recto-vesical fascia between the urethra and vagina is of little value in repairing cystocele or that between the vagina and rectum in posterior colporrhaphy. You here see what well-defined layers they really

are and how their lateral attachments are strong, so, though they may be exceedingly thin in your cystocele and rectocele, you cannot afford to neglect them in repair work, especially at the lateral origins. The physiological facts, too frequently overlooked, give us rational grounds for our plastic work—that muscle tissue develops with use, after recuperation with rest, whereas fascia recuperates only with rest. The two are always associated where stress occurs, the fascia to prevent the overstretching of the muscle, the muscle to prevent the overstrain and allow recuperation of the fascia. And consequently, you will find a properly repaired perineum upon which there is no continued tension from a prolapsing of upper structures gaining in strength and size as time passes.

The deep muscles, those between the layers of the triangular ligament, are much better defined. By that I mean that there are well-developed muscle bellies and the fibers are not spread over as great an area. These anterior muscles are called by Piersol the urogenital sphincter, but if they are always as individual, it would be better that they should be known independently as the constrictor vaginæ and the compressor urethræ of other writers. The deep transversus perinei are as large as the superficial and are of such size that the surgeon's statement of their being of little value is not well made.

Now we reach the shelf of fascia around the cervix and at the base of the broad ligament, and here is where I believe there has been marked injury in those patients who develop prolapsus of the uterus and upper vagina. And as these supports are so well marked in an uninjured pelvis does it not seem more reasonable to use some type of operation which will correct the relaxation here?

I am not going to discuss the mechanism that keeps a normal uterus in position. You all have your own ideas. But I will venture to suggest that possibly the infundibulopelvic ligament has more to do with this mechanism than it is usually given credit for. You can see in these slides the comparatively large amount of muscle tissue helping to compose it. The sacrouterine ligaments are also well defined.

Now as to the injured perineum. Here is a case of marked rectocele with the central tendon intact. I shall show you quickly how the muscles have retracted into scar tissue and the resultive distorted relation of the lateral structures.

I want you to note how strong and well defined are the anterior edges of the triangular ligament and how well the urethra is attached under the pubic arch. A little later I will show you what an ex-

Median Section of Female Pelvis.

Peritoneum overlying ureter has been removed. The relation of ureter to Iliac vessels and base of broad ligament is thus shown. Rectal and vaginal canals outlined in red. Round ligament shown entering inguinal canal.

ceptionally large suspensory ligament of the clitoris we have in this particular subject.

In May, 1911, I read a paper before our local society on the subject of "The Principles Underlying the Cause and Treatment of Retrodisplacements" in which I attempted to express in an as attractive way as possible to the general practitioner the ideas that the reading and teaching of the subject had given me. A little later I came upon a paper with somewhat the same trend of thought but giving the sympathetic nervous system the blame. Still later an article by Goffe expresses in a better way than my paper the principle that always seemed to me of most vital importance. I then thought with the "Kelly dictum" that retroversion was a first stage in prolapse and that the injured pelvic diaphragm was at fault. While the injured diaphragm is always a contributing factor and a repair is absolutely essential for a cure, as a conclusion based on these dissections I now feel that injury to the supporting layers above the true pelvic diaphragm has to be present and, this being so, it places the causation of prolapse in a distinct class from retroversion. Retroversion is bound from the nature of the mechanics to be a primary stage of prolapse, but prolapse should not always be considered as a result of retroversion.

In these illustrations you can see that contrary to the statements of Dickinson in "Genital Prolapse," 1910, and others the vagina is upheld laterally throughout practically its whole length by first, the fibers from the levator ani and superficial muscles, and above that by the reflection of rectovesical fascia in which are some muscle fibers.

This article of Dickinson deals with the study of cleavage lines and prolapse conditions occurring as slides along these cleavage lines as faults. The loose attachment of the rectovesical fascia to the muscle sling posterior to the rectum would tend to favor just such a slide. To get a slide of the bladder and urethra under the pubic arch would, however, necessitate extensive injury and I can hardly imagine injury excessive enough to cause the same thing in the "rectoanal" segment without a tearing through of the levator and coccygeal sling, for the anal fascia is pretty closely woven into the muscle fibers. Between the urethra and vagina the conditions ought to produce a ptosis of the whole septum or a hernia through the fascia rather than a slide of the vaginal wall on the fascia.

You will all agree with me when I say that the vast majority of prolapse cases in whatever degree or form are the sequel of childbirth. And with Dr. Tracy you will also agree when he says that

thorough plastic work is most essential to obtain good results, but that even thorough plastic work will be followed by a large per cent. of failures if the uterus is not maintained in normal anterior position.

Lathrop writes that prolapse occurs first as a result of weakening of the uterine ligament, and second, through weakening of the pelvic floor. Few writers emphasize the weakening of the cervical sling.

In most cases of prolapse the cystocele is the most difficult condition to correct. The greater number of prolapse operations are devised to permanently cure that condition. I do not attempt to discuss the relative value of hysterectomy as compared with the interposition operation. The Watkins operation, according to Tracy and Mayo, is followed by from 2 to 32 per cent. of failures. Are not the failures due to the fact that we are in this Watkins' procedure depending for support from above only on the twisting and thus the relative shortening of the broad ligaments. If the fundus of the uterus is hung high enough to rest against the symphyses pubes and the body is not too long to force it down, it will stay. If it hangs low, on account of a too relaxed broad ligament, provided it is big enough to straddle the pubic arch, it will remain.

When sufficient atrophy takes place, it then protrudes to the point where the upper supports become "on tension," for as you all know, any lower support, no matter how adequate, will give in time to continued pressure.

Polk in his suprapubic operation on the pelvic floor, McCann of London in his extensive resection of the vaginal vault, and Somers of San Francisco in his application of the detached sacrouterine ligaments in front of the cervix, attempt to make use of the supports at the cervical plane and yet retain the uterus. If we feel the necessity of retaining the uterus, why not make an application of either Somers' or McCann's method and then also do as Goffe advises—shorten the round ligament in front of the transposed fundus being careful to reattach the distal loop at the normal origin to prevent an abnormal plane formation. Thus we should get the whole uterus slung high in the pelvis and in an anterior position. If we want to conserve child-bearing, the bladder could be left below, but then we are open to the criticism I have made against the anterior plication operations of Willis and Goffe from the standpoint of bladder interference and infection.

I will now show you some slides as a means of illustrating and emphasizing the possibility of extensive perineal relaxation without mucous membrane tears, as well as the rather infrequent occurrence

of true rectocele in prolapse cases due to the fact that the rectum being restrained from coming down by its upward continuation is supported as by a splint by the uterine body.

The ease of picking up the muscle sling in perineal repairs and the ability to differentiate it I think is also well shown in these color photographs. The simple operations of cervical repair and amputation as well as the demonstration of relaxed vaginal outlets are more readily shown than by black and white photographs and we leiminate the personal equation introduced by the draftsman.

BLOCKING THE SYMPATHETIC BY A METHOD OTHER THAN SPINAL ANESTHESIA TO PREVENT SHOCK IN THE COMBINED OPERATION FOR CANCER OF THE RECTUM OR RECTO-SIGMOIDAL JUNCTURE, WITH SOME IMPROVEMENTS AND MODIFICATIONS OF TECHNIC.

BY

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FOR some time we have needed a method by which shock could be minimized, or prevented, in the combined operation for cancer of the rectum. We believe that the high mortality associated with this operation, especially in men, could be almost entirely eliminated if an easy and simple method of blocking, not entailing great delay, could be found.

It is self-evident that spinal anesthesia should accomplish this, but the writer, for one, has never felt that this method was free from danger—even when used by those most familiar with its technic. Furthermore, this particular method is not always suited to the combined operation, because of the different positions in which the patient has to be placed in order to complete the operation with ease and comfort.

We are not unmindful of the fact that the specific gravity of an anesthetic can be so increased as to make it hypertonic, or, in other words, heavier than the spinal fluid, which is about 1.007–1.008; but at the same time, so far as we have been able to observe, there is always a certain amount of shock accompanying an injection of any fluid into the subarachnoid space. As we have already shown in a previous article, there is always the danger of disturbance of pressure with cessation of respiration.

Through the kind permission of Professor Stockard, and his associate, Dr. Burrows, the writer had an opportunity of studying some excellent dissections of the sympathetic, together with dissections of the spinal cord, and from these studies, we have evolved a very simple plan of blocking the sympathetic, which will be, so far as we can judge from a limited experience, of inestimable value in preventing shock in the combined operation for cancer of the recum or rectosigmoidal

juncture. Furthermore, we have so improved the technic as to make the operation much easier and safer and, while the procedure we are about to describe requires surgical dexterity and judgment, yet it is so simplified that very much less time is necessary for its accomplishment, and the danger from hemorrhage has been almost entirely eliminated.

The patient, after having been prepared for operation in the usual manner, is given 1/4 gr. morphin and 1/200 gr. hyoscin, unless for some reason this is contraindicated, and is then placed in the left Sims position. The spine of the sacrum is usually bifid, and does not reach within an inch of the sacrococcygeal joint. Under such circumstances the insertion of the needle is a comparatively easy matter. In other cases the opening is close to the sacrococcygeal joint, and the safest plan to follow, then, is to locate this joint and, inserting the needle at this point, follow the bone closely, when the needle is bound to enter the sacral canal. One can easily tell if the needle has entered the sacral canal by moving it back and forth, when the bony structure will be felt if the needle is in the canal; if it is not, the needle will be readily felt under the skin. Of course, in a very fat subject, it is possible to make an error; but even under these circumstances, it can be demonstrated that the needle is in the canal by bending the outer portion inward and trying to pass the point through the skin, when, if under the skin, it will pass out, and if in the canal it cannot pass out. If the needle is very long, however, and is passed to one side, it is quite possible to pass it through the skin above the crest of the ilium.

The safest method to adopt, especially by those who are not very familiar with this procedure, is to make an incision a little in front of the sacrococcygeal joint, and, if necessary, extend it until an opening is found. This can be done under local anesthesia.

The point at which the needle is to be inserted is first decided upon. This can be determined by following the sacral spinous processes until they are found lacking. Slightly above this point will be found the opening of the canal. If, as happens in most cases, we have a bifid spine, the ridges can be easily felt, except in very fat subjects. If the canal opens near the sacrococcygeal joint this point is selected. Then, having first determined the point at which the needle is to be inserted, and this is always in the median line, it is painted with tincture of iodine. Next, a little ethyl chloride is sprayed on the skin and a hypodermic syringe, containing a solution of 1/500 cocaine, with an ordinary hypodermic needle, is employed in order to anesthetize the skin over the area in which the needle is

to be inserted, so that a small incision can be made without causing any pain. It is always better to incise the skin in order to obviate any chance of infection.

The following procedure is used in passing the needle: The needle is grasped in the right hand, and the index-finger placed close to the point. It is then passed at an angle of about 15° until the bone is reached. The needle is then passed close to the bone until it has been entirely inserted for about 1 inch. At this juncture, it is well to pause and determine whether the needle is in the canal or not. This can be determined, as we said before, by moving the needle back and forth, up and down, and from side to side. If it is in the canal, the wall will be found on all sides, and if not the needle will pass readily through the skin.

When the needle is found to be in the canal, about 4 c.c. of the same solution is deposited on each side. This is usually sufficient.

After this has been done the trocar is reinserted in order to prevent the escape of fluid, and the needle, with the trocar, allowed to remain in position until anesthesia is established. The reason for this is because if the anesthesia is not established after fifteen minutes, it may be necessary to inject 1 or 2 c.c. more, and this is made much simpler if the needle has been left in place.

It is important for the fluid to be absolutely sterile and freshly prepared; also of the same specific gravity as the blood in order that it may be readily absorbed.

After this has been accomplished, the patient is placed in the lithotomy position, and the abdomen painted with tincture of iodine, this afterward being washed off with alcohol. The object of this is to prevent any irritation of the peritoneum from the iodine; some cases of chemical peritonitis having been reported by our friends.

The abdomen is then opened by a median incision, and a self-retaining retractor placed in position. The patient is put in the Trendelenburg position, and the small intestines carefully walled off with one large pad about the size of an ordinary towel. We prefer this to a number of smaller pads, and it has worked very well so far. When the small intestines have been thoroughly packed off, the patient can be returned to the prone position, if it is deemed advisable.

The next step is to block off all the sympathetic nerves within the triangular space bounded by the common iliac. The needle used for this purpose is about 2 inches long, curved on the flat, and has a probe point, the object of this point being to prevent perforation of the iliac veins. The technic is as follows: An incision is made in the

mesentery on one side at the apex of the common iliac arteries, slightly above the bifurcation of the aorta. The needle is passed in through this incision, and all the space between these arteries is infiltrated with a solution of 1 per cent. novocain. If necessary, the inferior mesenteric plexus can also be treated in the same manner. After this has been accomplished, the sympathetic nervous system of the entire hypogastric plexus is blocked. Now, by means of a scissors curved on the flat, the right mesosigmoid is slit as far down as the bladder, or uterus, as the case may be, and continued around on the anterior surface of the rectum to the other side, thus separating the rectum from the bladder or uterus. The right leaf of the mesosigmoid is treated in the same manner. When this has been done, the sigmoidal artery is double tied close to its root. Afterward, the superior hemorrhoidal artery is double tied, and the surgeon, with a scissors curved on the flat, proceeds to scoop out all the fat and glands between the folds of the proximal mesosigmoid. This scooping process continues from the promontory of the sacrum to the levator ani muscle. After the middle hemorrhoidal artery, which is a branch of the obturator, has been clamped, both leaves of the mesentery are cut, and this cutting process is carried down to the levator ani muscle. The rectum can now be readily separated from the prostate and urethra as far down as the levator ani muscle. The tumor and sigmoid are then packed down in the pelvis, and the peritoneum dissected up from the side of the pelvis and attached to the bowel, thus making a new diaphragm about 2 inches higher than the former peritoneal attachment. All raw surfaces are covered by attaching the peritoneum to the gut, either by a continuous catgut suture, or by several interrupted sutures, and the abdomen closed in the usual manner. This entire procedure should not occupy more than thirty minutes.

After the abdomen has been closed, the patient is placed in the lithotomy position, and an incision made, beginning about 1/4 inch back of the posterior commissure, to the sacrococcygeal joint. The levator ani muscle is then perforated by means of a scissors. One of two procedures may then be followed: The gut can be pulled through the levator ani muscle posterior to the anus and the tumor removed, after which both ends of the gut are treated with carbolic acid, and the proximal end, with the distal, invaginated through the anus, and an end-to-end anastomosis made. Or, and we prefer this method, the mucous membrane may be dissected from the anus, just as is done in the Whitehead operation, and the dissection continued until the bowel is thoroughly freed. The bowel and tumor are then pulled

through the anus, the tumor removed, and the gut sutured to the skin. A drainage tube is then placed in the hollow of the sacrum and packed around with iodoform gauze. The posterior incision is then closed by means of interrupted silkworm-gut sutures, thus completing the operation.

This operation can be done at one sitting, or in two stages, depending upon the condition of the patient and the rapidity with which the operator can work.

PUBIOTOMY VERSUS CESAREAN SECTION IN NEGLECTED CASES.

BY

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My object in bringing this subject before you is mainly influenced by the existence of a great difference of opinion among competent obstetricians as to the mode of procedure in a given case of dystocia due to disproportion of the size of fetal head and the pelvis in which attempt at delivery was made by the general practitioner, or in cases of labor in which asepsis and antisepsis were not scrupulously observed.

A great deal of the work of the consulting obstetrician belongs to this class of cases. The average practitioner in the city or country has as yet not acquired the knowledge necessary to establish a diagnosis of relative disproportion of the fetal head to the pelvis. This is particularly true in multiparæ who have had previous spontaneous births. The fact that the difference in weight in children may be as much as 5 or 6 pounds and often more, and may cause the greatest amount of dystocia, is but seldom taken into consideration.

In reviewing the literature of obstetrics of the past ten years one is impressed with the fact that hardly anything new has been brought forth during this time. The only advance made has been in the establishment of certain operative procedures in given cases of dystocia. But with the advance of the operative technic, the application of the same has not been, so to say, "standardized," which is very essential for the successful development of any particular operative procedure, in order to obtain the minimum amount of morbidity and mortality.

It is, therefore, apparent why I choose to call the attention of this association to one of the mooted questions in obstetrics of today, with the hope that a full discussion of the same will bring forth a consensus of opinion as to the proper method of procedure.

We have at our command three methods of delivery of a living child; first, high forceps; second, Cesarean section; third, pubiotomy.

Delivery by high forceps was justifiable in the days when obstetrical surgery was not fully developed. Then asepsis and antisepsis

were not well understood, and it was a life-saving procedure for the mother, for if she were not relieved she would have died from exhaustion and sepsis. In the light of our present knowledge, it is hardly justifiable, especially so in primiparæ. We know of no other surgical measure where the same principles are carried out. We know of no procedure in surgery where it is attempted to pull through a fetal head of distinctly greater dimensions than those of the cavity. If such an emergency arises in the course of an operation, either the opening is enlarged or the mass is made smaller; mere force as a means of accomplishing it is never brought into play, and no surgeon would ever countenance its use.

To practise modern obstetrics, three cardinal principles must be kept constantly in mind before treatment of a given case of dystocia is undertaken: *First*, the effect of the operation upon the mother; *second*, the effect upon the child; *third*, the operation from a purely technical and surgical standpoint.

In the study of the high-forceps operation we fail to find any of the above principles considered; its effect upon the mother is familiar to all who do it, the injury to the lower segment of the uterus is well known; next to version, the uterus is more frequently ruptured or perforated by the forceps during this mode of delivery than during any other obstetrical procedure. The injury to the vaginal vault is often so extensive that an attempt at repair is futile.

Practically speaking, all the plastic operations on the vagina are made necessary through childbirth. If obstetrics is practised scientifically, the more extensive lacerations may be avoided. But if it is practised indifferently, the result is that our gynecological clinics become filled with suffering womanhood.

The effect of high forceps on the child is too well known and hardly needs discussion. A great number are stillborn; others, while delivered alive, survive but a few hours or days. They usually die either from a fractured skull or from intracranial hemorrhage produced by the compression of the blades. It is difficult to estimate the actual fetal mortality caused by the high-forceps delivery as the majority of these operations are performed in private dwellings. Our health boards do not require a proper and scientific classification as to the cause of death. As a rule, the vague statement of "forceps" or "instruments" is sufficient. No attempt is made to find out the kind of forceps that were used; whether high, medium or low, and, therefore, nothing could be gained by inspecting the vital statistics.

In order to place the subject of the paper in a concrete form and that it should be of practical value, I would formulate the following questions:

How should we proceed to deliver a given case of dystocia due to relative disproportion of the fetal head and pelvis which has been in labor twenty-four hours or longer, with cervix dilated or dilatable, in charge of the family physician or midwife, who has been examined frequently, or after forceps were applied and failed, the child still viable and sepsis and antisepsis not strictly observed?

Should we presuppose infection in these patients and is delivery to be accomplished by pubiotomy, or is the question of infection not to be considered and the abdominal route to be adopted?

I realize the difficulty of a proper solution to this question, but as all problems are solved by past experience, I hope the personal observation of the members of this association will decide this question either one way or the other.

I do not want to be misunderstood, that I am attempting to place the pubiotomy operation in competition with Cesarean section or *vice versa*. I am certain that this is the only class of cases in which either operation may be performed, depending upon the view the operator takes on the question of infection. I always considered pubiotomy as an operation of emergency, not of election. To deny this operation its usefulness in properly selected cases would be a great loss to obstetrical surgery and the probable loss of a great number of patients. An operation that has been performed over 1000 times by a great number of competent obstetricians must not be dismissed lightly. It is only a question of establishing definite indications for its performance.

I believe that pubiotomy is the only operation in border-line cases that have been mismanaged or misjudged. It adds but little additional risk to the mother. The patient, however, should always have a strong test of labor. The head should be somewhat engaged and forceps should have been attempted, and if then the child is still alive, pubiotomy should be performed.

The technic of Döderlein has been followed. If the patient is a primipara, I perform an episiotomy on the opposite side so as to facilitate delivery and also to prevent a communicating tear of the vagina and pubiotomy wound. No attempt is made to unite the cut ends of the bone. The separation of the ends obtained in my cases was 3/4 inch in some cases and over 2 inches in others.

My experience with this operation consists of nine cases, and I shall here give in detail a report of same:

CASE I.—Mrs. B. B. Russian, aged twenty-five, primipara, last menstruation January 15, 1911, came to engage me in the sixth month of pregnancy. On examination the diagnosis of justominor pelvis was established. The pelvic measurements were, interspinous, 24; intercristal, 26; external conjugate, 21; diagonal conjugate, 10. She was put on Prowchnic's diet and instructed to call every two weeks for observation, and was advised to have labor induced in the thirty-seventh week, but refused.

Labor pains began about 5 P. M., October 12. She was admitted to the Jewish Maternity Hospital about 8.30 A. M., having strong pains every fifteen to twenty minutes. On examination, at 10 A. M., the cervix was dilated two fingers, and the membranes ruptured. At 5 P. M., the cervix was two-thirds dilated and the head in first position, attempting to engage. The pains at this time were very strong and almost continuous, the uterus almost in a tonic state of contraction. Morphin was given hypodermically and patient rested for about two hours. At 9 P. M., the cervix was fully dilated, the head still high in the pelvis. At midnight another dose of morphin was given, hoping that a short interval of rest would bring out more forcible uterine contractions, but with no effect whatsoever. At 3.30 A. M., after the cervix was fully dilated for six hours, the pains occurring every two to five minutes and the fetal heart suddenly becoming weaker, immediate delivery by pubiotomy was decided upon and a living child weighing 6 1/2 pounds was extracted.

There were no complications during the operation and delivery. Bleeding from the wound was very slight. The vagina was packed as a routine measure. The separation between the cut ends of the bone was about 2 cm. The wound was dressed and a strip of adhesive plaster across the pelvis applied to prevent any undue motion and separation of the cut ends of the bone.

Convalescence was normal. The patient was out of bed on the fifteenth day, and mother and child left the hospital on the eighteenth day. There was no difficulty whatever in walking. The fetal measurements were as follows: Length, 50; suboccipitobregmatic, 32; occipitomental, 13; occipitofrontal, 11.

The reason delivery by forceps was not tried at first in this case was mainly on account of the sudden change in the fetal heart. I feared that the additional injury to the child would possibly cause it to be stillborn.

CASE II.—Mrs. F. K., patient of Dr. W. Naring, primipara, commenced to have labor pains Thursday, October 12. The pains were irregular and weak, but Friday became stronger. At 4 A. M.

Saturday, the cervix was fully dilated; at 9 A. M., after five hours of active labor pains and no progress, artificial delivery by forceps was decided upon. After moderate pulling by the attending physicians, no progress was made. At this juncture I was summoned to see the patient. On examination the cervix was found fully dilated, the head in the left occipitoanterior position wedged in at the inlet, the fetal heart good, the mother beginning to show signs of exhaustion. I attempted to deliver her with forceps, but after a trial of about ten minutes it became evident that it could not be effected. The fetal heart sounds still being good, I suggested that the only possible method of delivering a living child was by pubiotomy. The family physician having concurred, the patient was transferred to the Jewish Maternity Hospital. Pubiotomy was performed and a living child weighing 8 pounds 4 ounces was delivered.

The measurements were as follows: Mother, interspinous, 21.5; intercristal, 26; external oblique, 20.5; external conjugate, 19.5; diagonal conjugate 10. Child, biparietal, 9.5; suboccipitobregmatic, 9.5; suboccipitobregmatic circumference, 34; occipitofrontal, 35; length, 52.

The patient underwent a mild febrile convalescence, but was out of bed on the seventeenth day, and mother and baby left the hospital at the end of three weeks.

CASE III.—Mrs. C. S., patient of Dr. I. I. Bernstein, twenty-eight years old, para-ii. First labor, three and one-half years before, normal; the child weighing 5 1/2 pounds (mother's statement). The membranes ruptured November 3, at 6 P. M., one hour later labor pains set in which lasted during the night. The face was presenting. At 8 p. M., after the cervix was fully dilated, delivery by forceps was attempted, but they slipped. A few more applications were made, but with the same result. At this time I was asked to see the patient.

On examination I found the cervix fully dilated, but beginning to be edematous, the face presenting in the transverse diameter of the pelvis, the head large and above the brim, but the child still viable. The patient showed signs of exhaustion; pulse 120 to 130, temperature 101° F. She was transferred to the Jewish Maternity Hospital for pubic section. A living child, weighing 8 pounds 12 ounces, was delivered. It was evident that the head and neck of the child were severely injured by the many applications of the forceps.

The puerperium ran a septic course, the temperature ranging

between 102 and 106° F. for fourteen days. The patient finally began to improve and was discharged from the hospital at the end of twenty-six days. A large hematoma of the head and neck developed in the child, which died of asphyxia on the fifth day. The patient had a flat pelvis, but not markedly so. The fetal head was rather bony and well developed.

The child's measurements were: Length, 51; occipitofrontal, 36; suboccipitobregmatic circumference, 34; bisacromial, 41; biparietal, 10; suboccipitobregmatic, 9.5; occipitomental, 13.5; occipitofrontal, 12.5; bisacromial, 13.5.

In this patient it was the overdevelopment of the child that caused the dystocia, as evidenced by the normal course of the previous labor when the child was small.

CASE IV.—Pubiotomy. Mrs. A. S., patient of Dr. L. Ritter, aged thirty-four, para-i. Patient began to have labor pains on January 3, which were rather irregular and weak. During the 4th, the membranes ruptured. On the same day about 8 P. M., pains became stronger and more frequent. The breech was presenting and the cervix was fully dilated. January 5, during the entire day, notwithstanding the strong pains she had, there was very little progress. Patient began to show signs of exhaustion toward evening, the pulse rose from 120 to 130, the temperature 101°.

I was asked to see patient about 8 P. M. of the same evening, and on examination I found the breech presenting, the child rather large; the pelvis was contracted and of the justominor type; diagonal conjugate measured 10 cm. plus. It was evident from external examination that the child was large and out of proportion to the pelvis. The fetal heart sounds were good. The chances of delivering a living child under these conditions were apparently improbable. In the interest of the child pubiotomy was suggested as the method of procedure, and with but little additional risk to the mother. The attending physician and the family concurring, the patient was removed to the Jewish Maternity Hospital. The patient was prepared for delivery and a Gigli saw introduced as a prophylactic measure, and the legs of the child brought down. It was very evident from the appearance of the lower extremities that the child was large and well developed and that extraction through a contracted pelvis was impossible. The fetal heart still being good, pubic section was performed, and a living child, weighing 8 pounds 10 1/2 ounces, was delivered.

The separation of the cut ends of the bones was almost 2 inches, giving just sufficient space to deliver the head. The child was born

asphyxiated, but was finally resuscitated at the end of one-half hour.

Mother and baby were out of the hospital at the end of twenty-six days.

CASE V.—A. C., aged twenty-three, para-ii. First labor instrumental, child alive. Admitted to the hospital April 2, 1912, at 12.45 A. M. Cervix three fingers dilated, head not engaged. Temperature 100°, pulse, 112; respiration, 24. At 4.30 A. M., the cervix was fully dilated, patient had severe pains, but the head did not engage. At 7.30, 1/4 grain of morphin was given; at 9.30 A. M., she was taken to the operating room for delivery. Forceps were applied by Dr. I. S. Tunick, but no progress was made. At 9.30 the forceps were tried by me, but it was evident that the fetal head was too large to pass through and pubic section was decided upon. Delivery was completed with forceps. The separation of the cut edges of the bone was about 3 cm. The child lived four hours and apparently died from injury to the head produced by the forceps. The mother made an uneventful recovery and was discharged April 21.

CASE VI.—Mrs. D. B., patient of Dr. N. O. Ratnoff, aged twenty-five, para-ii. First child delivered by version, stillborn. Admitted to the hospital October 1, 1912, after being in labor twenty-four hours; cervix fully dilated, membranes ruptured. Patient had strong labor pains during the entire day and night, but the head attempted to engage only slightly. October 2, 1 P. M., delivery by forceps was attempted. After a trial by Dr. Ratnoff and myself for about twenty-five minutes no progress was made. The mother was anxious for a living child, so pubic section was decided upon.

The cut edges of the bone separated fully 6 cm., and delivery was accomplished by forceps. The mother and child were discharged from the hospital October 18, both in good condition.

CASE VII.—Mrs. B. F., patient of Dr. M. O. Magid, aged thirty-nine, para-iii. First labor premature in the eighth month, child stillborn. Admitted to the hospital November 11, 1912, at 10.30 A. M., having been in labor nineteen hours. Cervix fully dilated, membranes ruptured; head not engaged. At 11.30 A. M., delivery by forceps was attempted, but no progress was made and in the interest of the child pubiotomy was decided upon. Delivery was accomplished by forceps. The cut edges of the bone separated 3 cm. The mother and child were discharged November 27.

CASE VIII.—Mrs. F., para-ii. First labor instrumental; child died. Second labor gave birth to a premature child.

Was in labor at her home thirty-six hours. Membranes rup-

tured when cervix was two-thirds dilated. In spite of strong pains, no progress was made. Parents were very anxious for a living child. Patient began to show signs of exhaustion.

I advised her removal to the hospital. At the hospital delivery by forceps was attempted, but no progress could be made, so pubic section was performed in the interest of the child.

Mother and child were discharged from the hospital on twentieth day in good condition.

CASE IX.—Mrs. L., patient of Dr. M. O. Magid, para-vi. All labors difficult. Instrumental deliveries, two children were still-born, one died in the puerperium. Two are alive.

Membranes ruptured at the onset of labor. Patient was in labor forty-eight hours. Pains strong and frequent, but head does not seem to engage. At this stage of labor I was asked to see her and advised her removal to the hospital. Delivery by forceps was attempted, but forceps slipped, so pubic section was performed. With the bone divided and separation of about an inch and a third, it was difficult to extract the child, so the patient was let alone and sent to the ward in the hope that with stronger pain the head would engage. The following morning the child was extracted by forceps.

Patient developed a phlegmasia alba dolens which kept her in the hospital five weeks. Mother and baby were discharged after the local condition subsided.

In turning our attention to the statistics of Cesarean section of various operators, we are impressed practically with this fact; that the mortality and the morbidity are influenced by the number of so-called "unclean cases" that are included in the list. Cesarean section in clean cases should have a small percentage of mortality. It should not be greater than any other clean abdominal operation. By adopting a broader field for abdominal section the consequences are, that not only are many mothers lost, but that the operation in itself is thrown in an unfavorable light, as the profession at large never enters into details of statistics and very often the family physician and through him the relatives will insist upon craniotomy on a fully viable child. The same principle in a lesser degree holds good for the pubiotomy operation. Many obstetricians take the position that a craniotomy should not be performed on a living child. A great number of cases are brought into the hospital in which delivery was attempted by the attending physician with forceps, but failed. On examination fetal heart sounds may be elicited and therefore the child is to be considered viable, but the injury to the fetal head may be such that it will only survive a few

hours or days. In such cases pubiotomy should not be considered, but craniotomy is the operation of choice, as pubiotomy is only performed in the interest of the child, and unless the outcome for the child is favorable, otherwise it should never be resorted to.

My experience with abdominal section consists of thirty cases.

In reviewing my series of Cesarean sections, one fact stands out prominently and that is that nearly all the patients that I have managed personally recovered with a minimum amount of morbidity, while patients who were handled on the outside at their homes and brought into the hospital in an emergency upon whom section was performed, the greatest percentage died from sepsis and other complications. In this series of thirty patients, six died—three from septic peritonitis one patient developed abscesses along the line of suture in the uterus and died on the twelfth day; one developed sepsis and complete anuria and died on the fourth day; and one was an eclamptic with a contracted pelvis; she did not rally and finally died on the third day.

All these patients were attended at their homes before admission to the hospital and were examined quite frequently

We must come to realize that a woman in labor who has been examined frequently or upon whom some manipulation was done, is unlike any other surgical patient and, therefore, should be treated more conservatively. We have no means of ascertaining whether sepsis is already present or when it is liable to develop, and the opening of the peritoneal cavity and the incising of the uterus may be the turning-point to a fatal issue from peritonitis or other complications.

Finally, I wish to state that while my results from pubiotomy were quite favorable, still I feel that it must be performed only in cases where there is no other alternative. It must also be performed very carefully, and if one is not trained in gynecological surgery, it should not be undertaken. The injuries to the soft parts and to the bladder and urethra may be quite extensive. The sacroiliac joint may be injured, and if this possibility is not borne in mind, this will result in permanent disability. Hemorrhage may be profuse and, at times, uncontrollable. Communicating vaginal tears take place in a moderate number of cases. While I did not encounter these complications, still one must be ready to meet and treat them properly. Pubiotomy should never be the operation of choice; it is always one of emergency. In cases that have been misjudged and neglected, with the child still viable, it is the only method of procedure, and only an experienced obstetrician should undertake its performance.

CONCLUSIONS.

1. A close study of statistics of Cesarean sections of various operators compel us to assume that cases which are brought into the hospital with a history of a long and tedious labor, who were frequently examined or delivery by forceps attempted, are supposedly infected and, therefore, abdominal section should not be the operation of choice.

2. In such cases pubiotomy becomes the operation of necessity, for it adds very little danger to the mother and it saves the child.

3. Pubiotomy is not an operation of election.

4. Cesarean section and pubiotomy never compete. In cases where Cesarean section is indicated, pubiotomy is contraindicated and *vice versa*.

UTERINE HEMORRHAGE ASSOCIATED WITH HYPERTROPHY AND SCLEROSIS OF THE UTERINE VESSELS.

BY

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AN article(1) appeared in the February number of the AMERICAN JOURNAL OF OBSTETRICS entitled "Metrorrhagia due to Atheroma of the Uterine Vessels." The writer of the article advises that "hysterectomy should be the treatment of these cases, and should be performed before they have advanced so far that very marked arterial changes have occurred."

Some sixty cases, as reported by Fr. Proescher, Pathologist, have come under my observation as assistant in the service of F. Blume, Gynecologist of the Allegheny General Hospital. In our opinion, this vascular condition is neither the specific cause of the bleeding nor should the pathological report of its presence be considered final in determining radical surgical procedure in all cases.

In the May number of the same journal, an article entitled "Surgical Treatment of Uterine Hemorrhage from the Nonpregnant Uterus," (2) makes no reference to sclerosis of the uterine vessels, and, it is merely mentioned, as a condition that may be present, but not definitely associated with hemorrhage, in the discussion of this and other papers read at their symposium on uterine hemorrhage in the Transactions of the Obstetrical Society of Philadelphia.

In view of the careful investigation and discussion given this subject, especially during the past, ten years and, considering the fact that nothing has been found specifically characteristic to account for the bleeding in these cases, I feel that this subject should be kept prominently before the profession until more definite information results.

Gardner(3) and Goodall review the salient historical points in the literature on this subject, as follows:

Scanzoni, in 1860, wrote the first scientific article on chronic metritis, associating chronic inflammatory endometritis with chronic metritis.

Seifert, in 1867, claimed that chronic metritis, more properly termed chronic infarct of the uterus, was chiefly due to disturbance of normal puerperal involution of the uterus.

The microscope, then, began to influence investigators, but, due to low power and poor technic, the conclusions were variable and contradictory.

The use of the curet, advocated by Olshausen in 1870, centered investigation on pathological changes in the endometrium as the probable cause of menorrhagia and metrorrhagia.

The development of the study of bacteriology further led scientists to believe septic endometritis to be the cause of chronic metritis.

Fritsch, in 1885, attributed diffuse fibrosis of the uterine wall to prolonged inflammatory reaction.

Cornil, in 1888, writes, "To the naked eye, the muscular tissue is a pale red color, presenting a series of opaque lines which are thickened arterioles in a state of atheromatous degeneration."

Reinicke, in 1897, claimed there was a primary chronic metritis without sign of inflammatory reaction either in the uterine wall or its neighborhood with a perfectly healthy endometrium.

Theilhaber and Meier, in 1902, like Reinicke, referred the hemorrhage to muscular insufficiency of the uterus, as did Palmer Findley, in 1905, in some of his cases.

Certain cases of uterine hemorrhage suffering from menorrhagia, metrorrhagia, or both, intractable to medical treatment, local treatment or curettage, finally come under the care of the gynecologist for definite relief. When the patient has been anesthetized, and the scrapings from the endometrium and pieces of tissue excised from the cervix are submitted to the pathologist for frozen section and microscopical examination, the report sometimes informs us of the existence of marked hypertrophy and sclerosis of the uterine vessels.

The etiology of sclerosis of the uterine vessels, as well as the pathological relation it may have in causing intractable bleeding, are questions not yet satisfactorily answered.

Whether the increase in the connective tissue in the uterine wall or in the vessels is primary or secondary has been questioned, and, also, whether or not the bleeding is due to the fragility, loss of compressibility, contractility or retractility of the vessels, muscular insufficiency of the uterine wall, condition of the endometrium, functional activity of the ovary or some cause outside of the uterus yet unknown.

We have no method of properly estimating the effect of the ovarian secretion and the condition of the nervous mechanism in regulating blood pressure, the contractility of the muscular fibers, the elasticity of the fibroelastic tissue, and the coagulability of the

blood, in considering the value of each in controlling bleeding in these cases.

Reinicke(4) claims that the connective-tissue change in the myometrium is secondary to the arteriosclerosis, owing to defective nutrition, and is not due to inflammatory process, and ascribed the bleeding to vascular change in certain of his cases and to muscular insufficiency of the uterus in others.

Gardner and Goodall claim that the two groups of involuntary muscle, the media of the vessels and the uterine muscle, act together and supplement each other, hypertrophying and undergoing involution after labor, contracting and retracting in the arrest of hemorrhage after labor, and, also, in chronic metritis, the vessels as well as the uterine muscle undergo fibroid changes. They ascribe hemorrhage in these cases to the biological or pathological change in one group of involuntary muscles being the chief cause, and, the other, supplementary.

Solowij and others claim that the vessel change is secondary, compensatory to muscular insufficiency of the uterine wall.

Proescher says, basing his statement on some 200 microscopic examinations of different uteri showing sclerosis of the vessels, that there are cases having no hemorrhage where sclerosis of the uterine vessels is very marked, and other cases associated with serious hemorrhage where there is very slight evidence of these sclerotic changes, and, therefore, that this condition of the vessels is not the cause of the bleeding.

Theilhaber(5) and others attribute the bleeding in these cases to a muscular insufficiency of the uterus brought about by an intermuscular and perivascular development of connective tissue following a diminution of the muscle fibers due to atrophy from overexertion after repeated pregnancies, so that the uterine muscle is unable to spontaneously contract and prevent overcongestion of the endometrium.

Goodall(6), Anspach(7) and others have suggested the ratio between the fibroelastic and fibrous connective-tissue fibers as probably an important factor in controlling bleeding, but Smith(8) was unable to verify this in his specimens.

Pankow(9) says, "From a comparative anatomical examination of uteri from bleeding and nonbleeding multiparæ and nulliparæ, there is no evidence of anatomical change to account for hemorrhage. All the changes in the myometrium considered in causal relation with bleeding are found only in part of the clinical bleeding cases, and are found in others having no clinical history of bleeding."

Just as muscular insufficiency of the uterus, due to repeated pregnancies and involutions, in cases in the preclimacteric period and at the menopause, has been suggested as a cause of bleeding, so has chronic metritis, due to organic and inorganic poisons, and congestions, been suggested in earlier cases as causing a similar insufficiency of the uterus.

We can attempt to reconcile this like condition due to different causes by the biological law, that, whenever the parenchyma of an organ degenerates or atrophies through disease, lack of activity or overexertion, connective-tissue development ensues to replace it and establish a mechanical equilibrium, either fibroelastic or the more poorly organized fibrous connective tissue.

There seems to be an analogy between true diffuse arteriosclerosis in the life cycle of the individual, biological in variable degree after maturity, but distinctly pathological at an earlier age, and local hypertrophy and sclerosis of the uterine vessels in the functional cycle of the uterus, biological in variable degree in the preclimacteric period and at the menopause, but more distinctly pathological prior to that time.

The present tendency is to regard sclerosis of the uterine vessels, also many changes occurring in the ovary, endometrium(10) and myometrium, formerly considered as distinctly pathological conditions, as biological changes developing during the functional cycle of the female generative organs.

The hyperplasia(11) of the endometrium often found associated with sclerosis of the uterine vessels and hemorrhage is not to be considered a true endometritis, but should be looked upon as a result rather than a cause of bleeding. The endometrium does not undergo thorough involution after one hemorrhage before another occurs with its attendant hyperactivity. As this hyperplasia is found at times unassociated with uterine hemorrhage, and, in many cases of hemorrhage, it is entirely lacking, it cannot be considered the cause of bleeding in these cases.

Westphalen and Thoma state that the uterine vessels show degenerative changes earlier than any other system of vessels in the body, due probably to changes in blood pressure and periodical dilatation incident to menstruation and pregnancy, and, also, that the ovarian arteries show identical changes with those of the uterus in the same case. Consequently, analogous to biological changes in the uterus, we may look upon the changes in chronic oophoritis—thickened tunica albuginea, increased connective tissue in the stroma, small cystic degeneration and sclerosis of the vessels—as biological

changes in the functional cycle of the ovary. No anatomical or pathological change has been found in the ovary characteristic in these cases of hemorrhage. Diseased ovaries continue their function of initiating congestion of the uterus, just as the diseased thyroid gland prevents the development of myxedema.

Certain conditions that would be suggestive in causing congestion of the endometrium—onanism; excessive venery; high living; endometritis; malpositions of the uterus; uterine tumors; heart, liver or kidney disease; psychic disturbance; unstable balance of the vasomotor mechanism; laceration of the cervix with erosion; tubal disease; ovarian tumors; pelvic abscess—are often found coexisting in these cases without causing any disturbance of menstruation.

Frankl's(12)theory of a ferment from the uterine glands altering the endometrium by biochemical change and permitting the escape of blood, and also, Sturmdorff's (13) theory of a secretion from the endometrium that which the clotting of the blood, do not account for the bleeding in these cases, as the type of menstruation and hemorrhage is not dependent upon the anatomical character of the endometrium.

Further study of the effect of the internal secretions as associated with uterine bleeding is indicated. Is any anatomical or pathological condition of the mammary glands, thyroid gland, pituitary or adrenal bodies, associated with uterine hemorrhage, characteristic?

Bandler(14) is of the opinion that poor muscle and elactic tissue fibres are present, degeneration being replaced largely by fibrous connective tissue, and that the vessels and capillaries have also lost their elasticity or become sclerotic, and, consequently, the uterine wall is unable to resist the congestive influence of the ovaries for the usual period of twenty-eight days, and bleeding comes on every two or three weeks, metrorrhagia, or there is inability to check the normal menses, menorrhagia, or both. In other words, when biological or pathological changes overbalance, causing muscular insufficiency of the uterus and hypertrophy and sclerosis of the uterine vessels, possibly the equilibrium between the augmentative and inhibitory forces of congestion is destroyed, while the ovaries retain their normal function of causing uterine congestion, and bleeding results.

Solowij(15), Rabinovitz(16) and others claim that the changes in the vessels do not constitute a true arteriosclerosis. The morphological change in true arteriosclerosis extends from the intima outward (Gull and Sutton), while Solowij says, these cases show connective-tissue growth around the adventitia into which it finally

extends. The intima is normal except occasionally a slight increase in the endothelium, while, in true arteriosclerosis, there is an increase in the number or size of the endothelial cells and a tendency to the obliteration of the blood-vessel lumina by growth of connective tissue from the intima, which may also extend outward toward the media causing atrophy of its muscle fibers, and, finally, into the adventitia. The media undergoes a muscular hypertrophy, probably compensatory, termed "hypermyotrophy" by Reinicke, and, at times, shows hyaline degeneration of the muscle fibers. The adventitia shows a very pronounced increase of connective tissue. The lumina of the vessels are either gaping, narrowed or closed by the meeting of the opposite surface of the circumference, and any narrowing or obliteration would be due to muscular hypertrophy of the media. These cases do not necessarily show arteriosclerotic changes in other parts of the body. The bleeding is not due to the friability or atheromatous condition of the vessels. Associated with the vascular change, there is an increase of connective tissue in the uterine wall between the muscle bundles, between the muscle fibers and around the blood-vessels, and a diminution of the muscular structure, which, in many cases, shows hyaline degeneration. The hypertrophied, sclerosed vessels, due to lessened compressibility, contractility and retractility, favor an overcongestion of the venous plexus of the endometrium. The apparent(17) increase in the size and number of the vessels is probably merely an hypertrophy and dilatation of those already present.

Thoma has called attention to the fact that the arteries lose their elasticity before they show sclerosis in true diffuse arteriosclerosis, and Guiteras(18) notes that the loss of elasticity occurs in the early stages and is compensated for by an hypertrophy of the muscular coat. · May not the absence of the later manifestations of true diffuse arteriosclerosis, atheroma, calcareous infiltration and friability of the vessels, be due to the fact that this local condition exists when the causes producing the other are not yet operative?

The varicose veins present in certain of these hemorrhagic uteri may give intractable bleeding after curettage(19). They are dilated, hypertrophied and sclerogenic in character corresponding to the same process in the arteries, their media, of course, not being well developed as in the arteries, permits dilatation. The loss of contractility of the uterine wall permits congestion of the veins, as there are no valves(20) in the intrinsic uterine veins.

Bonney(21) concludes that the extent to which these uteri are diseased is not well established, as the fact that, after utriculoplasty,

the conserved portion of the uterus may revert to the performance of normal menstruation, impregnation and delivery, proves that the uterine wall may be insufficient, but that it is not greatly abnormal, and shows the wonderful recuperative power of the uterus.

The loss of blood in these cases of intractable bleeding may cause sudden death, or anemia, chronic invalidism, loss of general vital resistance endangering life from intercurrent diseases, loss of local resistance predisposing to infections, or, possibly, tumor formations.

The diagnosis of hypertrophy and sclerosis of the uterine vessels depends upon microscopical examination of pieces excised from the cervix. Examination of the scrapings from the endometrium are chiefly of value in excluding malignancy of the corpus uteri. However, the condition of the vessels in the cervix is not conclusive as to the condition of the vessels in the corpus uteri, only suggestive.

Cases of true arteriosclerosis of the uterine vessels have been described by Cruveilhier, von Rokitansky, Klobb, Findley(22) and others, but these occurred in individuals long past the climacteric and were associated with general senile decline. Such hemorrhages took place into the uterine parenchyma, endometrium, or myometrium, apoplexi uteri, the blood rarely finding its way to the uterine cavity, or, in such small amounts, as to require no interference.

It is questionable, if, with our present limited knowledge of the pathology and etiology of uterine hemorrhages complicated with sclerosis of the uterine vessels, preventive treatmen can be of any benefit. Excluding malignant disease, we are at a loss to satisfactorily explain these hemorrhages.

There seems to be an analogy between the development of cancerous tumors in the general epithelial tissues of the body, common after maturity, but rare at an earlier age, in the life cycle of the individual, and their development in the local epithelial tissues of the uterus in the preclimacteric period and at the menopause, but much less frequently during its earlier functional cycle. Proliferation of fibrous connective tissue is the feature in common. Evidently, it was this condition of the tissues that Ribbert(23) had in mind when expounding his theory as to the causation and development of cancer, viz.:

(1) The epithelium has no excessive proliferative power in old age, but has its original or lessened proliferative power.

(2) The subepithelial connective tissue (around the glands, under the skin, under the mucous membranes) proliferates, grows upward in the direction of least resistance, surrounds and separates groups of epithelial cells from normal epithelial tissues.

(3) Such groups of epithelial cells are no longer subject to their normal tissue tension or pressure, which prevents them from overgrowing neighboring tissues, but grow *ad libitum* and burst through their abnormal confines producing metastasis and ulceration.

Believers in the parasitic theory of cancer might claim this condition of the tissues a favorable soil.

It is suggestive, at least, that, in a certain percentage of cases, we are possibly dealing with percancerous conditions. Careful investigations, however, in this direction have thus far failed to substantiate this theory, but these negative results cannot be accepted as deciding this question. We know how obscure, how misleading, the conditions are in the precancerous stage of other organs. The history of patients with cancer of the stomach, for instance, often shows that they have been under medical care for irregularities in indigestion, for chronic gastritis (chronic catarrh of the stomach), many years, have gone from one watering place to another, until more serious symptoms developed clearing the diagnosis. Uterine hemorrhages, irregularities in the menstrual flow, should, therefore, receive the most serious consideration of both the women and the physicians. Unfortunately, women are too ignorant with regard to their sexual organs, do not understand the importance of an early diagnosis, and listen to the gossip of friends rather than to the advice of the physicians. Attempts to instruct them through literature, as inaugurated many years ago by Winter in Germany, have been only partially successful. The way to reach the masses is through the schools, as advocated by F. Blume 24, as follows: "The education must begin in the final grade of our public schools, and should be continued in the high schools and colleges. The classes are to be divided so as to separate the sexes. A female teacher should instruct the girls, and a male teacher should educate the boys, among other topics, upon the dangers of gonorrhea, abnormal vaginal discharges, etc." The education of the laity upon sexual matters is one of the most important problems before the profession at the present time. A very important step in the right direction has been taken recently by the Chicago schools by the introduction this Fall of instruction upon sexual matters to the pupils.

There is diversity of opinion as to the proper treatment of this condition. Some writers recommend hysterectomy as soon as the diagnosis of sclerosis of the uterine vessels has been made. Evidently, such a radical measure is permissible only under certain conditions. The sclerosis of the uterine vessels has nothing to do with the hemorrhage, it is only a complication of a condition outside of

the uterus which is the cause of hemorrhage, but which, thus far, we have not been able to satisfactorily locate. If a degeneration of the uterine vessels is found in patients who come to us for other ailments than hemorrhage, as in cases of laceration of the perineum and cervix, ectropion and erosion of the cervix, cervicitis, etc., hysterectomy is contraindicated. Patients with uterine hemorrhages not due to malignant growth, but complicated with sclerosis of the uterine vessels, should not be subjected to hysterectomy unless the ordinary simpler methods of treatment have failed to give relief. This rule is especially applicable to women during the child-bearing age.

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